The Builder.

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UTILITARIANISM in Architecture was the subject of the paper read by the Rev. J. L. Petit, on the 22nd instant, at the Architectural Exhibition in Suffolk-street. The object the lecturer had in view was to inculcate, almost as if in denial of a doctrine put prominently forward by Mr. Fergusson, in his ably-written and profusely illustrated "Handbook" (of which we shall speak more at length shortly), the necessity on the part of architects of acquiring knowledge, and making the most, of the materials obtainable, of attending to the purposes of the building they had to design, and of acquiring and carrying out sound principles of construction, by which means they would ensure a certain degree of excellence, and ultimately attain much more. Explaining why to some extent the amateur had advantages and facilities in meddling with established rules or popular opinions over the practitioner, who might thereby jeopardize his position, he would seek indulgence by avoiding dogmatism.

Architecture has, beyond the mere object of providing us with shelter and personal comforts, a further and higher purpose,—the development and exercise of certain noble faculties of the mind, both in the spectator and designer,—and much which would otherwise have been considered superfluous, becomes essential, and its uses must be recognised by us, even if we should regard usefulness as the only test of merit. In short, he maintained, attention to appearances was no more superfluous in the structures built for our use than in the clothes we wear, or in the habits and actions of our lives. To what extent we might with propriety bestow cost and thought upon the appearance of a building, beyond what was necessary to fit it for its professed and primary purposes, he thought it would be hard to say: he believed, indeed, that there was no limit. He said this, and gave some instances, that he might not be misunderstood in what would follow. But his real business on the present occasion was rather with architects than with their employers: and we will now allow the lecturer to speak in his own words, with only such omissions as our limits enforce.

It appears to me, he said, that architects must be, and that good architects always have been, guided by utilitarian views. They have no right to overlook, or compromise in the smallest degree, the original purposes of the buildings they have undertaken, for the sake of ornament, be it of the highest order. You will observe we have been talking of superfluities, not substitutions; of something beyond what was strictly necessary, not of something offered instead of it. In the noble churches to which we have referred, the parts necessary for the performance of religious rites were always the first care of the architect: the choir was generally first completed and consecrated, then the remainder of the body of the church, and last of all the towers and the enrichment of the fronts. These were added, not substituted for anything: nobody would have thought of designing an inconvenient plan for the sake of the grandeur or richness of which it was capable.

There are good reasons why we should rather make the best of our old churches, than materially alter them, or destroy them, to build others in their room: the impression they are calculated to produce more than compensates for some inconvenience in their form or arrangement; but there seems no reason why we should ever plan or build a new church of an inconvenient form, or in any way unsuited to our own manner of worship. If, for instance, it is desirable that all the congregation should be within sight and hearing of the minister, why should a church ever be built in which a part of the congregation is hidden from him when he performs any part of the service in the usual place? And this must be the case in every church having aisles which terminate at the division between the nave and chancel. If we find that galleries are useful and convenient, why should we build churches that will not bear galleries, or to which they are a disfigurement? If we professedly adopt high-pitched roofs as suitable to our climate, why should we ever combine them in such a manner as to leave a lodgment for snow or rain? There may be difference of opinion as to the advantage of an unbroken area, or the expediency of galleries; still they serve my purpose in illustrating the proposition I would advance, which is, that an architect ought not to abandon a convenient arrangement on account of its ugliness, but rather try to get rid of the ugliness without giving up the convenience.

If, then, a feeling that his first object is to make his building fully answer its primary purpose, and a determination that nothing shall be allowed to interfere with this object, be referable to a spirit of utilitarianism, I conceive that so far, at least, an architect ought to be a utilitarian. It is far from the highest element of his art, but still it is a very important and indispensable one.

But I will go farther, and express my conviction that utilitarianism, even in its very lowest sense, that which leads us to study how to satisfy the conditions required at the least possible cost, is not to be altogether discarded by the architect. I do not mean that a parsimonious spirit should be encouraged in his employers, far from it; nor that he should pander to such a spirit (as I have occasionally been accused of doing when I have made remarks similar to those I am now offering, and which ought not to have been so misunderstood); but that he should learn how best to meet the exigencies of persons who, whether from their limited circumstances, or from a feeling as to the right apportionment of their expenses, cannot afford to lay out anything on superfluities. We know that a great number of churches, schools, hospitals, and other buildings for pious and benevolent purposes, have been, and are still being erected by the voluntary contributions of private individuals; and it is but fair to suppose that many of the contributors give fully as much as can reasonably be claimed from them; as much as they are justified in giving, and some whose resources are seriously injured by it. Who has not seen applications, the formula of which might be stereotyped, to the effect that in such or such a parish it has been found necessary to meet the wants of the increased population by erecting a new church or school; that on, or perhaps before its completion, a heavy debt was found to have been incurred, for which some individual of limited means, generally the clergyman, was responsible, and that therefore an appeal was made to the liberality of the public. Now surely, in some instances, much of this embarrassment might have been obviated by an architect who had studied economy, both in his designs, and his manner of carrying them out. By doing this, he is not countenancing those who have given less than they ought, and who, whatever be the ultimate cost, have risked nothing beyond their contribution; but he is showing his consideration for those who have given amply according to their means, and risked more than they have given; and therefore I still hold that the problem, how to build a cheap church, is one that ought to be mastered; and I verily believe its solution would tend to raise, instead of lowering, the standard of church-building. For the problem is not to be solved by bad work, base ornament, insufficient construction, or perishable material. The building must have dignity, durability, convenience, and an appearance suitable to its high destination. The architect who devotes his thought to the production of this at the least possible expense, will, I conceive, advance and ennoble, instead of debasing his art; for, to go no further, his being cut off from expensive ornament will throw him more directly upon the resources of form, composition, proportion, and arrangement. All that is said in "The Lamp of Sacrifice," on the use of costly material and elaborate workmanship, is excellent; but it is applicable rather to the employer who pays for the building, than to the architect, who designs and constructs it. The offering of the latter is his thought, his time, and his care. And this may be a sacrifice of great value, and one that costs him much. For he may have to give up much popular applause; to work under much discouragement; to be content with the approbation, and that not unmixed, of the few who can appreciate real excellence; and to give up the admiration of the many who are attracted by show. He may have to work in brick, when he sees his competitors working in marble; still he may ultimately find that he has laid the groundwork of a reputation independent of the costliness of the materials of which he has the disposal.

We are now prepared for the consideration, whether usefulness and economy may not only be consistent with artistic excellence, but actually tend to the development of much that is grand and beautiful. If picturesqueness is a merit, I can answer for it that the most picturesque objects I have seen are buildings of the most strictly utilitarian character, without a speck of ornament, and you may be sure erected at no more cost than was deemed necessary, without the slightest attention whatever to appearance. I speak of the furnaces in the neighbourhood of Wolverhampton. Some of these, taken as buildings, independently of their accompaniments of fire and smoke, are absolutely grand. There is something, too, very impressive, to my mind, in the lines of modern fortification; but I suspect their designers never thought of producing any impression, except through the medium of shot and shell.

Should you, however, dispute the grandeur and picturesqueness of the objects I have instanced, you will hardly deny these qualities to the mediæval castles of Europe. Part of the charm may be owing to their state of decay, and yet those that are most perfect are not the most devoid of grandeur and picturesqueness: they are neither the least impressive to the spectator nor the least attractive subjects to the artist.

I will not attempt to enter into a definition of picturesqueness, or to criticise any that has been offered; but it is certain that a studied picturesqueness, if not wholly valueless, is incomparably of less value than that which is inartificial; unless, indeed, the art is too subtle and refined to make itself prominent, which can only be when the picturesque outline or arrangement appears to come naturally, or to rest upon utilitarian grounds. We are not equally bound to conceal the art by which beauty, sublimity, and solemnity are attained: on the contrary, any evidence that care and thought have been bestowed upon their attainment increases the charm; and this is more displayed by a connection and adaptation of the means of producing effect to the primary purpose of the building than by keeping the latter out of sight. If, for the sake of making a church beautiful, we make it inconvenient, or unsuitable to its purpose, what is it but to confess that we cannot make such a church as we want beautiful,—a confession which an architect ought to be ashamed of making.

I have never entered at all into the arithmetical and geometrical rules which have been asserted to govern architectural proportions;—not that I think the investigation is a loss of time; for it is very probable, I may say certain, that such rules have been laid down, with a view of securing a pleasing proportion, and of preserving something like uniformity among buildings of the same class: but I can see no clear data on which they could have been founded. If, upon the strength or stress of materials (the most legitimate basis), the actual size is a most important element, for strength does not increase in the same ratio as size: a beam of 40 feet length and 6 feet square, is not so strong (in supporting its own weight either where projecting from a wall, or resting upon a column at each end) as one 20 feet long and 3 feet square; simply because the weight increases according to the third power, and strength according to the second. Of course

I assume the material to be uniform throughout, and the same in both cases.

But if we take the human form as a basis, the result may prove different. I will try and explain my meaning by considering the aperture of a door. Now, if this be so formed that, in passing through it, the crown of the head is at the same distance from the lintel that the shoulders are from each of the posts, the proportion, under certain limits of size, cannot be very wrong. You will find that a doorway in the form of a double square, to admit an ordinary person in such manner, namely, that he shall be at an equal distance from the lintel and the side posts, ought to be about 6 feet 8 inches in height, and the half of that in width; and a door of that size and proportion will not, I think, look amiss. If the door is smaller, it must be narrower in proportion to its height; if larger, it must be wider; but in this direction it is clear we soon come to a limit, since too wide a door is both ugly and inconvenient. I am not laying down a rule for the size and shape of doorways, but merely suggesting how certain proportions may be deduced from the human figure, and how materially they are influenced by actual scale.

I much question whether there are any actual proportions, say, for instance, between the sides of a rectangular figure, positively and abstractedly more pleasing to the eye than others. I suspect any preference is traceable to some association, whether of habit or propriety in certain conditions. We require them to be different in different positions, or, as we have seen, where there is a change of scale. The same shaped archway will not serve for door, window, pier arch, and vaulting arch: the form that pleases in one offends us in the other. From which I infer that positive usefulness is very likely to prove the true groundwork of fine proportion. We have seen that actual scale is a very important element in proportion; and therefore the architectural draughtsman will find the advantage of being able so to sketch a building as to give a fair idea of its actual size. I know very well, that drawing for effect is discountenanced by some, as having nothing to do with architecture, and it is used unfairly by others. Yet it is as necessary to know the effect of a building, as the means by which the effect is produced. Plans and geometrical drawings give the means: a sketch shows the result. If I can look at St. Paul's every day, I do not want a sketch of it: plans, sections, and elevations will serve my purpose: I am well familiar with the result, and know how I am impressed with it: what I want to study is, how that effect is obtained. But if I have never seen St. Peter's, I must have something more: I want not only to see how the architect worked, but how he succeeded in his task; whether the impressiveness of the result was worth the pains and cost bestowed upon it; and this I cannot get without sketches or pictures that give the form to the eye as presented by perspective, and convey a true notion of the size; I mean, as accurate a notion as the sight of the building itself, from the point of view chosen, would give. Photography may possibly be brought to do this; and if it be, the value of architectural photographs, already so considerable, will be much increased.

None but a great man could have designed the dome of St. Peter's; and an architectural student cannot employ his time better than by carefully examining the proportions of fine buildings; and if there is any principle by which they are fixed, endeavouring to investigate and apply it.

The Cathedral of Worms has always struck me as being remarkably fine in its proportions. And here the towers and cupolas, though grand in themselves, are no more than sufficient to give life and variety to the outline: they do not predominate, like the towers and steeples of an English cathedral. The general effect is that of a large oblong building, with a turret at each angle. * * * The height of the vaulting, if I do not mistake, differs little from the interior width of the nave and aisles inclusive: this, you know, is a common proportion in cathedrals. The large Romanesque churches in Germany are generally, I think, of better proportion than those of later date, which are apt to be very short in the nave. Limburgh Cathedral has a nave of only two squares, independent of its aisles and western towers; and its whole proportions are so lofty, that it has the character almost of a huge tower, built for defence: this, however, well suits its position, on the summit of a precipitous rock. Our large English churches of the Norman style, are of very good proportion, where the plan is undisturbed. Tewkesbury is an example. The same may be said of Normandy, and, indeed, most of France. The general outline of St. George, Bocherville, is most satisfactory. The Early Pointed Abbey Church of Fecamp does not differ very materially in proportion from the older churches. I have elsewhere mentioned the churches of Anjou, and among them the ruined church of Doué, near Saumur, the plan of which strikes me as peculiarly fine. The nave has three squares, the tower, chancel, and transepts, each one square, the chancel and transepts having eastern apses or chapels. There are no aisles. The cathedral at Poitiers has a very simple, unbroken outline: it is well worth studying. And I need not remind you of Salisbury as a specimen of the most exquisite proportion in our Early English.

In pointing out these examples as worthy of admiration and study, I am not recommending the indiscriminate adoption of their plans for our own use. They were excellent for the purposes for which they were designed; but others may be more suitable for our services. There is hardly a church by Sir Christopher Wren that does not exhibit a true feeling for proportion, as well as a strict attention to all the requisite conditions of a church. St. James's, the church on Ludgate-hill, St. Benet's, Paul's-wharf (which has lately been pointed out to me as a masterpiece in its way), furnish us with models of undoubted excellence, and they all owe their merit to composition rather than ornament.

Construction will often furnish us with good principles of composition. A building that appears to be well constructed, to have all its masses properly supported, with enough preponderance of strength to ensure perfect stability, and the different supports proportioned to the work they have to do,—such a building must require a great amount of bad ornament to make it look ugly and unpleasing. There must of course be some superfluities in the supports, but these should be well proportioned to each other. For instance, each pier in the nave of a cathedral should be more than sufficient for the weight which depends on it, but not so large as those under the central tower. There are some cases where the central piers are scarcely, if at all, more massive than the others, as in the Cathedral of Autun, but this arrangement is not pleasing, for if the piers which bear the greatest weight or strain appear perfectly secure, there cannot but seem to be a waste of strength and material in the others. Yet the central piers ought not to be so large and heavy as to suggest the idea that the tower is supported by them without the aid of abutment. A church with a central tower or dome is pleasing, because it manifestly carries out that system of construction by which large spaces are roofed or arched over. The building itself forms its own abutments, and does not require an additional expense of material for the support of the great weight which rests upon it. A large central tower is sustained by the actual walls of the nave, choir, and transepts. It wants no further piers or buttresses (of course I speak of a church without aisles). If the cross form is in itself convenient, which it is in many respects, then the central tower over the intersection, if properly treated, need not render it otherwise. It pleases us both by the mechanical skill it displays and by the actual beauty of outline which it gives the structure.

But if the tower rests upon a substructure which is sufficient for its support independently of abutments, as though the tower itself were first built and rendered secure, and afterwards the limbs of the building added to it; then, in the first place, we lose the charm produced by a contemplation of mechanical skill, and next, we choke up our area at the very point where convenience demands that it should be most open and unbroken. This was often done in old churches, in which the form of service did not require wide unbroken areas; but it should never be done in modern churches intended for the English Established service. Where there are aisles there must of course be tower piers, but these may be made to project but little into the principal area. In some of our abbey-churches they do not project beyond the other piers into the central passage of the church, though by contracting the arches from the aisle into the transept, and also of the transept itself, they are made to preserve their proper preponderance: shafts resting on corbels, or brackets, support the inner orders of the transverse arch.

A display of mechanical skill gives us pleasure, if exerted on a worthy object; but we are not, or ought not to be, pleased by an unnecessary exhibition of ingenuity or contrivance. The architect who has surmounted a real difficulty that he could not avoid, or that lay in the way of some grand result worth obtaining, as the bridging or roofing over a vast space, or the construction of a lofty tower, has a right to make the most of it; to show or to conceal his construction according to the impression he wishes to produce on the spectator, provided always he takes care to satisfy him that his work is well and securely done. He may indulge either in excessive intricacy and apparent confusion, as in the rich steeples of Belgium, or affect a severe simplicity, as in the beautiful campaniles of Italy: he may hide or expose his means of dealing with the difficulty, whichever course he may think best calculated to enhance the triumph of his art.

But he must not exercise needlessly his power of contrivance: he must not create difficulties for the purpose of showing how he can surmount them. I am not clear that I think the roof of Henry the Seventh's Chapel quite worth all the mechanical ingenuity and contrivance bestowed upon it. Possibly a roof of a more ordinary construction would have given equal solemnity, beauty, and richness. But I will notice an example which is the more curious, as belonging to an age little given to architectural tricks (the twelfth century).

Among the abbey buildings at Fontevrault is a small chapel (if it be one, for I don't know whether its purpose has been ascertained), having eight sides, and a corresponding number of apsidal projections. Now you would naturally suppose that these projections would be attached to the sides; each side having its own arch and apse. Such a form would be simple in construction, elegant, calculated for stability, and, apparently, would fulfil any conditions of convenience likely to be required. Instead, however, of this, the apses correspond with the angles, and you may conceive that not a little contrivance and intricacy of arrangement is necessary to carry out the plan. The effect of the interior is remarkable, and not altogether unpleasing; yet when I saw it, I could not for the life of me make out what was the object of all this ingenuity.*

We will now take an instance of ingenious contrivance, for which we can find out a reason, and therefore we may admire it honestly. I mean the steeple of Antwerp Cathedral. The principal peculiarity in its construction is, that an octagonal stage stands upon a square base, not in the usual manner, having four of its sides corresponding with the sides, and the other four with the angles, so as to rest upon ordinary pendentives, but having an angle corresponding with the centre of each face, and with each angle, of the square tower. It will be necessary, when you go up the steeple, to ask for the key of the room in which the junction between the square tower and its octagonal superstructure is shown; and the construction is well worth notice. The chief feature is a system of four arches thrown across between the centres of the adjacent sides, thus forming a square compartment, set diagonally within the tower; their depth being sufficient to carry a considerable part of the face of the octagon placed upon it obliquely.

Now this is not a mere caprice. The lower

* This chapel is not often shown to visitors, the abbey being used as a prison: even the nave of the church is divided by floors, and converted into dormitories (the principle of utilitarianism is here, I admit, carried rather too far), and a written permission is required to enable you merely to see the choir and transepts, which are left open, and contain the tombs of the English kings, Henry II. and Richard I.

portion of the tower is in each face divided in two equal parts by a buttress, each having its window; and by the arrangement of the octagon its windows correspond with those below, the front presenting the two tower windows in the upper stage of the square portion, and two of the octagon windows almost immediately above them; thus carrying up the vertical lines, and giving a great effect of height.

In Strasburg the octagon is set in the usual manner; so that in looking at the steeple from a cardinal point, we have one window in its full width, and two (one on each side) narrowed by perspective. And this character is carried down into the square part of the tower by making a large central window, flanked by two actually smaller ones—an ingenious contrivance, which shows how much the architect studied the effect of his design. But a tower so divided seldom has the grandeur of one divided into equal compartments by vertical lines, and having windows or openings equal in width, in the same face and the same stage. This is usually the case with large towers: there are exceptions, like this of Strasburg, but they are comparatively few in number. The unequal division is apt to give a certain apparent weakness, or a partial and arbitrary distribution of strength, inconsistent with that perfect stability which ought to characterise such a fabric as a large tower.

It is not absolutely necessary that ornament should be either costly in material, or elaborate in workmanship. The use of brick, for architectural works of the highest order, is now generally recognised. Since our architects have made themselves well acquainted with the noble specimens of brickwork on the Continent, as throughout Holland, in many parts of France, in Lombardy, and much of Italy, they have ceased to regard brick as merely a poor substitute for stone. It has two great merits which do not belong to many other factitious materials. One is, that it is no imitation; it does not profess to be stone, or anything else but what it really is; and the other is, its durability, which has now borne the test of many ages. If we are building in brick, we may freely avail ourselves of all the modes of decoration which can be adopted in brickwork, whether plain or moulded. Considerable grandeur and even richness may be produced by deep and bold cornices, and a judicious use of string courses; and so long as they are executed in solid durable material, and there is no attempt to make them appear different from what they really are, no reasonable objection can be urged against them; nor need any unnecessary amount of manual labour be bestowed upon them.

By the way I would venture a passing remark upon string courses: a broad flat band with square edges, such as is most frequently used in plain domestic architecture, hardly ever has a satisfactory look. Now, neither breadth nor squareness is a fault in a building. It strikes me that the real defect is, the similarity of the upper and under surfaces. These surfaces perform different functions, and therefore ought to be differently treated.

I noticed the other day one of these bands, the upper surface of which was covered with a piece of lead, projecting sufficiently to throw off the rain. This, altogether, corrected the fault.

The lecturer then proceeded to speak of the treatment of sculpture in architectural works, and at this point we will return to his discourse in a future number.

SHARPENED EDGE TOOLS. — We take the following from a German scientific journal for the benefit of our mechanics and agicultural labourers: "It has long been known that the simplest method of sharpening a razor is to put it for half an hour in water to which has been added one-twentieth of its weight of muriatic or sulphuric acid, then lightly wipe it off, and after a few hours set it on a hone. The acid here supplies the place of a whetstone, by corroding the whole surface uniformly, so that nothing further but a smooth polish is necessary. The process never injures good blades, while badly hardened ones are frequently improved by it, although the cause of such improvement remains unexplained."

ON COLOUR AND ITS USE IN ARCHITECTURAL ART.*

LET me return more within the scope of the subject I have chosen. Depend upon it, the philosophy of art will not deteriorate the workman. Be it our aim to combine practice with theory. In speaking but now of the neutral tones of colour, the special note of which appeared to me to be a "variable monotony," an evenness of tone composed of two or more elements, I instanced the morning and evening mists, which, though cold and dull in their first aspect, are in truth possessed of very luminous qualities. They are not unlike in that respect the nebulous matter of which astronomers speak. They are seldom represented in painting by purely cold colours: they require that intermixture which commonly goes by the name of warm grey, frequently employed by Claude, &c.

Let me now show how this same principle may be applied to architectural works. Not only do we perceive in these the close connection of colour with light and shade, and of both with form, but the intermixture of one kind of tone or hue with another may be fairly exemplified.

Pugin, in one of his most popular works on the Pointed, or, as he termed it, Christian style of architecture, thus speaks of an important point in structure:—"Another most important, but now neglected part of masonry, is," he observes, "the jointing of the stones. All bond and solidity is frequently sacrificed to what is called a neat joint, by setting one stone on end to form a jam, when the same space in good old constructions would have been occupied by five or six stones tailing into the wall, and lying in their natural bed, a point which should be much attended to. Or, if the jambs are built in courses, they are made as uniform as possible, like rustics: by this means the effect of the window is spoiled, the eye, owing to the regularity of the work, is carried from the jamb to them; while in the good old masonry the irregular outline of the stones does not interfere with the mouldings of the windows. Another point to be remarked in the old masonry is the smallness of the stones employed. Now, independently of this being the strongest mode of construction, it adds considerably to the effect of the building, by increasing its apparent scale. Large stones destroy proportion, and to illustrate this I have given two representations of the same piece of architecture differently jointed. Not only are the stones used in ancient buildings exceedingly small, but they are also very irregular in size, and for the same reason I have before mentioned, that the jointing might not appear a regular feature, and by its lines destroy those of the building."

All this is very true, but it appears to me strange, I own, that in addition to these arguments, the distinguished author from whom I have quoted did not also make some allusion to the colour of ancient buildings as one prime source of their beauty. An old edifice composed of numerous small stones offers to the rays of light a rugged surface upon which the lichens and fern gather, presenting to the eye the most agreeable and harmonious tints. A modern building, on the contrary (especially if the Greek or Classic style be adopted), with its large square blocks of stone, gives us nothing but a flat surface with a colour (comparatively speaking) dull and monotonous. I was much struck with these truths lately on a visit to Rochester Cathedral where the tower and the eastern transept (Rochester has a double transept) were "restored," as I suppose we must call it, under Cottingham, in the year 1825. This happened but a few years before what we may fairly call the revival of religious art in this country began. Now the bulk of the cathedral of Rochester is in flint-work of Norman date, but the architect, I presume, convinced that he knew better than our ancestors, determined not to be behind with them in practical skill. Therefore he determined to build in stone squared, and with a highly-worked surface. The effect, as might be expected, is the worst possible, and the rude grandeur of the old Norman work is lost. Instead of that beautiful grey which old Norman work offers to the eye, we have a flat drab surface of smooth stones with neat jointings,—a surface which, instead of reminding us of York or Lincoln Minster, brings back to our minds the painted surfaces of Buckingham Palace and Belgravia.

Of all hideous surfaces to buildings (and there are many degrees of hideousness), none, I think, is worse than a cemented house painted drab. The fashion, I am sorry to add, is becoming more and more in vogue. It is a sad business that while our neighbours, the French, are building a city of cut stone palaces on the banks of the Seine, we are building a city of stucco houses (in most cases, I fear, very badly constructed) on the banks of the Thames. A few attempts at better things are to be seen; but alas! the long lines of suburban residences, manufactured rather than built, and the two vast towns of Tyburnia and Belgravia, prove how difficult, if not vain is the task of those noble-hearted few, the real architects of the day, who, by recalling to us ancient models, would stem if possible the tide of corrupt taste which has infected our commercial and utilitarian age.

Again, let me ask, why does old brickwork look better than new, in point of colour? Is it not in great measure because the pointing is worn out, and the surfaces of the bricks are unequal? Nothing can be finer in colour than the old Roman brickwork about the Forum, as seen in the baths of Dioclesian, and other places: the lichens collected on the rugged surface exhibit in perfection the variable tints it affords. Further to illustrate the same principle, some, perhaps, will remember that almost all the early masters who painted on canvas used a very rough surface, the granulation of which presents an agreeable effect to the eye. The same thing may be remarked of fresco, the beautiful tones of which are in a great measure due to the plastering on which it is executed being rough cast. Again, our water-colour masters use a rough cartridge paper for the same purpose, with excellent effect. All who remember the exquisitely natural sketches of Dewint, or the masterly works of Cattermole, can testify to this. Not, indeed, that a rough surface has anything magical about itself. It may rather be considered as a mechanical contrivance to save labour. Real beauty of colour consists not in roughness or smoothness of surface, but in that variety and changefulness of hue (not incompatible, indeed, with an even tone), which is characteristic of natural objects. Now, this may be obtained (in colouring), by the use of a material presenting sundry small inequalities, but in a higher degree, by the use of the brush in painting, and of the chisel in sculpture. The laborious process called "stippling," so well known to the painter of miniatures, has this object in view. Each touch thus put upon the paper or the canvass, has an individuality about it, which adds much to the total result obtained. All these contrivances, therefore, of rough paper, or rough canvass, are really inferior to what has been well called *durus limæ* labour, the hard toil of the finishing touches. This is that persevering, earnest love of the work for the work's sake, which gave such refinement and value to the works of our predecessors. Observe, then the bounty of Providence. It is the human hand and eye alone which can gain this exquisite perfection. In these days, when marvels are performed by machinery, in how many cases is it our lot to regret the real superiority of the old fashioned hand-made article. Above all, in point of colour, is this superiority noticeable? In it each touch has its peculiar value and significance. Why is a Cashmere shawl superior to an imitation? because, I apprehend, mechanical contrivance enters more largely into the latter than the former. The same principle, I believe, will account for the great superiority of the Oriental colouring, so much remarked upon both in the French and English Exhibitions. There is no machine so delicate as human fingers.

I hope I am not misunderstood. I do not undervalue the blessings of machinery, but I wish to point out the bounty of the Divine Governor of all things, who appears to have intended, that exactly in proportion as machinery comes into general use,—as we find ourselves

* Read by Sir Walter James, at Architectural Mus um See *ante*, p. 1.

obliged to resort to mechanical contrivance to satisfy our multiplying wants,—ought the value of human skilled labour to be better appreciated. While society continues in a healthy state it will be so. There are subordinate parts even in works of art, which may well be performed by machinery. The highest offices will always be performed by the hand, because it alone of all machines is at all moments under the presiding influence of an intelligent soul.

May I be permitted to illustrate my meaning? No mechanical contrivance was ever of more real and lasting benefit to mankind than the art of the printer and engraver, by which we are able to multiply the productions of the greatest minds. A fine engraver is second only to a first-rate artist. Many a man may say,—I cannot be the possessor of a work by Rembrandt, but I may have one of his etchings. A Raffaelle, few private persons may hope to purchase, but a fine engraving is within the reach of many. Thus it is that copper-plate engraving gives an admirable transcript of the works of the great masters—at least it does so in their light and shadow and outline. Colour alone is of that exquisite nature which appears to be beyond the reach of mechanism. Who ever beheld a coloured print that was other than a lamentable failure? And that, I apprehend, simply because of those exquisite and subtle variations which constitute fine colour. Why does the pictured mosaic or rich tapestry please the eye? Simply because, being the result of manual skill, they afford those infinite gradations of tone which mere mechanism cannot reach. It is a curious thing, that while a coloured print is almost always quite worthless, the tone of a valuable old engraving is precisely that part of it which the accomplished connoisseur most prizes. Our best photographers say that they can imitate any part of a valuable print except its tone of colour.

I shall be excused if I mention that these remarks appear to me satisfactorily to explain the immense superiority of old line engravings to those dishonest and flimsy methods of imitation which are so much in vogue. Line engraving may be numbered, I fear, amongst arts almost extinct in this country. I commend the subject to public care and sympathy, and trust that in that revival of the arts which it is the duty of the true architect to promote, the service which the engraver has in former times rendered to the architect will never be forgotten.

Next, perhaps, to the sedulous labour of the human head and hand, there is no finer colourist than old Time,—"Time's effacing fingers where the power of beauty lingers." Let me ask my present readers whether they are not conscious of something extremely grand in the elevation even of a London building darkened by the smoke of centuries. It is a practical question I would wish to put to them,—whether we really gain much by scraping the stonework of former times. Happily, St. Paul's, the greatest work of Wren, has escaped. Will any unprejudiced man assert that if we could scrape St. Paul's, and give it that peculiar air of freshness which always accompanies a stone building when new, we should improve its beauty. A few years would destroy, as far as cleanliness goes, all we had done, but would a few years restore that venerable look which greets us from those darkened arcades which surround the glorious dome.

An instance presents itself to my mind in the fine old Norman doorway of the Temple Church, which had an imposing appearance from an accumulation of dust and weather stains upon it: these are now lost. Another example is that of the doorway of the western front of Rochester Cathedral. The stonework here has not, I apprehend, been touched since it was first put up. Let us be thankful that in spite of the zeal of hostile fanatics and false friends we have still many similar examples.

In the beginning of the seventeenth century, which may perhaps be considered the period when a debased classical style was most prevalent in Europe, the old Gothic carvings were cut away, a barbarous classic architecture was substituted (and patronized, let me observe, by no class more extensively than by the Jesuit order), and men did not hesitate to talk and speak of modernizing and adapting Gothic. Even Wren, great man as he was, caught the general infection; for while he did not hesitate frequently to apply the spire, a decided feature of our northern Gothic, to Italian buildings, he made it often columnar in its outlines, as in the singular design, lately restored after a fire, of the church of St. John, in the parish of Limehouse. Alter Gothic architecture, and modernize or adapt it, was then the watchword. A century almost passed away before men grew wiser. Great as Wren was, Englishmen felt that they might be excused for thinking that William of Wykeham was in his way quite as great, and Frenchmen for believing that the Sainte Chapelle of St. Louis was a specimen of constructive ability not surpassed by the Madeleine. With a revival of religion, and of "peace amongst men," grew up a love of those old cathedrals in which our forefathers had worshipped. Modernize them! Oh, no! That was no longer the cry. Let us rather restore. And then, in the excess of our honest zeal we had the times when one of the best specimens of Norman architecture—the western tower of Canterbury, was destroyed and built up again at vast expense, in order to make way for a mere copy of its right-hand neighbour. A notion gained ground that we must make all things neat and uniform, even at the expense of historical truth, right feeling, and picturesque effect. We have come to the third, let us hope the wisest of our courses. We no longer talk of modernising or altering, and of restoration only in a whisper, for we should approach those venerable shrines with all those feelings we have for the weaknesses of a parent, with the strong conviction that the mediæval architects, with many roughnesses and failings, were on the whole far stronger and better builders than we are. Our watchword is, neither modernize nor restore, but preserve them. Take them as they are, with many faults of original construction, with many damages inflicted by the ruthless hand of time, and still more ruthless spirit of destructiveness. Still they have their pristine beauty of form, still their noble varieties of light and shadow, still those harmonious tints of colour are upon them, which are unto them as the hoary head is to the sage, one of the surest means of attracting public respect and admiration.

Let me endeavour to make a summary of the principles enunciated in this lecture,—

1st. To produce full beauty of colour, we must have large neutral masses varying in size and form, and arranged according to the principles of light and shade as understood by the painter.

2ndly. By a broad neutral mass of colour, it is not meant that it should be absolutely even in tone; but that while uniform in its general aspect, it should admit within certain limits of gradations and varieties. Such are weather-stains on buildings and old brickwork, which add to their effect exactly upon the same principle as fine chiselled work or delicate stippling improves the work of the sculptor or painter.

Here the proper subject of my lecture is at an end. A recent visit to the Exposition at Paris has induced me to put down, but in the same rough way I have hitherto adopted, the extent to which I think these principles may be exemplified by what is there seen. The building itself does not present the same magnificent *coup d'œil*, as our own Crystal Palace. As a construction it is infinitely more solid, and I must confess that its merits bear the test of long and frequent inspection better than the fairy structure which was reared like the airy fabric of some splendid vision four years ago, in our own Hyde-park. It is a fact, which I hope may prove to be one symptom of our national amalgamation with the French, that strength and solidity, which were thought to be the special characteristic of the English, are well represented in the Palace of Industry, while brilliancy and lightness, the usual notes of our lively neighbours, are still unequalled in the Crystal Palace. These remarks apply to the colour of the two buildings as much as to any part of them. The impartial critic will admit, that the colouring of the French building is superior, if not in brilliancy, at least in harmony, to our own.

There is a repose and harmony about it which is most remarkable. Almost all the light being admitted from the top, this affords room in the lower part of the building for those large masses of neutral background which, I have tried to point out, are essential to beauty of colour. The system has, indeed, been rather overdone, and it may perhaps be said that the neutral grey of the ironwork is deficient in relief.

The theory of Mr. Owen Jones was to employ principally the primitive colours. The blue used by him contrasts very well, I think, with the tender yellow on which it is introduced. It is more difficult to defend the brickdust red of the columns, which want relief and ornament. Had they been diapered with a rich crimson,—a process not very expensive in these days,—an excellent addition to their effect would have been produced. One great merit in the Crystal Palace is, that the atmospheric colouring of the fairy-like vault is preserved. How nobly, beneath its covering, did those ancient elm-trees stand out in strange contrast with palm-trees and tropical plants. Emblems they were, indeed, of civilization, combined with (what is its best part) a sturdy Saxon liberty. In the Paris Exhibition there is nothing like this,—there is nothing like fairy-land. The system pursued there is, in some sense, the reverse of ours: while with us each work of art was made subservient to the general whole; in France, on the contrary, much has been sacrificed (in general effect), in order to put the objects exhibited in the best light, and show them off to the best advantage. Instead, therefore, of having the primitive colours employed in every part, they are hardly used at all,—at least, in the framework of the edifice. There is at each end a splendidly coloured glass painting (though very indifferent both in design and drawing), representing allegorically France inviting the nations of the earth to the Universal Exposition. There is, moreover, goodly store of banners and flags, which add much to the general effect. In the Crystal Palace our first feeling partook of surprise, which afterwards diminished to a rational admiration. In the "Palais d'Industrie," on the contrary, we are studiously kept back from perceiving the vastness of the design; but our wonder is ever on the increase, and we are at each survey better able to appreciate the fidelity with which the objects of the promoters are worked out, even in the minutest details. Thus, at the entrance, and in the passages, which with us were totally neglected, there are hangings of great value, and tapestries of the choicest hues. Nothing is done in the temporary and slight manner which was in vogue with us. The Crystal Palace, or world's fair, as it is called, presented to the mind a great idea, in a consistent and intelligible shape; but there is nearly as great a difference between a beautiful sketch and a finished picture, as between the English Exhibition of '51, and that of the present year in Paris. The sketch was superior in ideal excellence, but the finished picture is more to be noted for the perfection of its parts than the simplicity of its design.

The colouring of the Palais des Beaux Arts deserves a few words of remark. The walls are of a dull and neutral grey, exactly of the same colour as the iron framework of the Palais d'Industrie. The effect appears to me decidedly bad. There are two good principles on which pictures may be hung. Consider them as exhibiting delicacy and beauty of tone, as in the sky of a landscape or the complexion of a fair face, and contrast them with a dull, heavy red. This is a very usual plan in England, and was much recommended by Sir T. Lawrence. View them, on the other hand, as brilliant representations of Nature, and place them on a field of light colour, a pale buff or a delicate grey. Thus it is we mount our water-colours with excellent success; but a dull, heavy grey, approaching green, answers neither one end nor the other. Landscapes especially, in which we have usually large quantities of a neutral green, suffer from this treatment. As connected with this branch of the subject, I cannot help stating that I consider the mixture of statues with pictures as a decided improvement. I wish that it could be more generally adopted in England. It has the glorious precedent of the Tribune at Florence in its favour, where the Venus de Medici is in the

same apartment with the *chef-d'œuvres* of Raffaelle. Why should our Academicians in Trafalgar-square be timid in following so bright an example.

There is another point, only one, on which I will touch, ere I conclude this somewhat lengthy paper. The French are naturally proud of having brought into more public notice, than was possible with us, the great subject of ecclesiastical art. This is delicate ground, but I hesitate not to say that in no country can any great art flourish, when debarred, as it hitherto has been with us, to too great an extent, of its highest privilege—that of doing honour to the Almighty in his sanctuary. Equally, or even more to be condemned than this total neglect, is the substitution of what I do not hesitate to call gaudy for genuine and sterling magnificence. Let us not forget that there are beautiful and highly-expressive coloursand forms characteristic of the pure faith of primitive times. In this spirit, if undertaken at all, is to be approached the subject of the application of colour to our churches. Of the two extremes, we should ever remember that it is far better to be too sober in tone than approach either gaudiness,—too much positive colour, or garishness—too much positive light. What we should above all aim at is that solemnity of colour which befits both the subject and the place, the dignity of the holy religion we profess, and the great God whom we delight to serve.

ON THE FORMS, METHODS OF CASTING, AND RINGING OF LARGE BELLS,

WITH SOME SUGGESTIONS ON THE SUBJECT.*

I AM aware of the old saying, that "it is much easier to find fault than to suggest a remedy." This is perfectly true in the present instance. I feel assured that the long established system connected with the manufacture and use of large bells is attended with many serious inconveniences, and that a vast opening for improvement exists, whether we regard the form, the mode of casting, or the usual method of ringing them; and although I can confidently point out difficulties and objections, I candidly admit that I am not prepared to offer positive improvements or remedies. There is scarcely a bell-tower in the kingdom which is not shaken to a certain extent, and the masonry disturbed. In some cases fissures of a dangerous character are formed from top to bottom: in others the ringing is altogether discontinued for fear of the oscillations bringing down tower, bells, and ringers, to the ground in one common ruin. If any one will seriously consider the operation of raising a body weighing ten or fifteen tons (a weight greater than any stone used in the erection of the British Museum, the Post-office, or the Royal Exchange) to the elevation of 150 or 200 feet from the ground, and, when so raised, whirling it in the air until the arc of oscillation becomes a complete circle; then, in addition to the simple gravitating weight, make a calculation of the centrifugal force in ringing, he will only be surprised that the towers, and the buildings adjoining them, are not more frequently destroyed by such violent proceedings.

Mr. Ferrey, who has had frequent opportunities of becoming acquainted with the subject, has written to me as follows:—

"You wish me to state what I have observed in the towers which have come under my professional notice, as to the effect of the mode of bell-hanging hitherto adopted. My remarks apply rather to the bad consequences arising from neglect or ignorance, than to the principle upon which bells are generally hung in towers and campaniles, in the frames technically called cages. Still, if some plan of bell-hanging could be adopted less liable to derangement than the framework commonly used, much mischief to church towers might be avoided.

"In the course of my examination of many ancient churches, I have frequently had to deplore the serious injuries caused to the towers by the action of the bells. However judiciously they may be arranged within the framework, there will naturally be some unequal strain upon parts of it: no sooner do the ringers find a difficulty in raising the bells, owing to the want of a proper bearing on the gudgeons, than they immediately begin wedging up the framework of the bells from the walls, window mullions, or any masonry nearest to the point where the bell which works heavily is placed: no attempt is made to brace the woodwork and so remedy the defect; but in order to prevent further spreading, struts and wedges are placed between the framing and the walls of the tower. With a heavy peal of bells the disastrous effects of this slovenly system must be obvious: the great vibration arising from the revolution of the bells is at once thrown upon the walls, and the damage resulting from it becomes very soon apparent. Our ancestors meant to avoid danger from this cause, and I do not know an instance of any importance where the tower walls are not provided with ample set-offs and brackets on which the old bell framing was placed perfectly free from the surrounding walls, and generally with a space sufficiently wide for a person to pass round the bells; the whole framework resting upon these set-offs as a dead weight only, no timber of any kind being inserted in the walls. If this plan was properly respected, and the framework carefully kept free from the walls, much structural injury might be prevented; bnt even then the oscillation which occurs must eventually damage the building. I have been in old towers while the bells were in full peal, which have *rocked* to such a degree as to cause me alarm; and the quivering vane and tremulous motion of other parts have given full proof of the extent of the vibration. In some central towers, I have observed much injury to the supporting arches and piers; as in the case of the tower of Othery Church near Bridgewater, the structure was rendered dangerous by the manner in which the tower piers were split and crushed by the action of the bells. In many instances, the belfry chambers are closed against the ringers, and the bells are only permitted to be *tolled*, owing to the dangerous condition of the towers. Very recently steps have been taken to rebuild the upper part of the spire of Bellbroughton Church near Stourbridge, the masonry of which was so loosened by the vibration of the bells as to become quite dangerous. I could mention many other instances which have come under my notice of the serious results arising from bad bell-hanging, and ignorant attempts to remedy the evil; but I have no doubt that other professional men will supply you with examples. I hear that you are proposing some new form of bell, by which the same musical tones can be produced without the necessity of their being put in such violent motion. If you succeed in this, and can give us the same joyful effect without the necessity for cumbrous wooden framework and risk to the buildings, you will have effected a very desirable object."

That the process of throwing bells up and down is inconvenient as well as dangerous, is proved by the fact that nearly all large bells are struck on the outside with a hammer, instead of being whirled round, either because the tower is in a dilapidated state, or that too many men are required to raise the bell, if it is to be rung according to the original intention of the machinery.

The most sonorous material for bells is found to be a mixture of copper and tin in certain proportions, generally four parts copper to one of tin. It is an error to suppose that silver enters largely into the composition of some bells, though the recently discovered metal, aluminium, is said to be very sonorous. The greatest care is requisite during fusion, not to heat the materials more than absolutely necessary, and when melted and sufficiently hot, to commence casting them with as little delay as possible; for metals in a fluid state may be distilled or sublimed by heat like other liquids; consequently, the tin being melted at a much lower temperature than the copper, will be driven off in a sort of acriform or vaporous state; therefore, in order to be certain that, when the bell is finished, it shall contain the proper quantities of each metal, great importance must be placed on putting in the tin at a proper time; or, when the cast is completed, its composition will be different in its proportions from what was intended: this will of course alter the sound, and very likely render such a bell less sonorous. If the bell is to be a large one, the metal must be fused at several furnaces, varying in intensity of heat, and some ready for the mould before the others; but wherever two or more currents of fluid metal meet, the rudiment of a fracture may be formed, as the chances are, that portions of oxide, or earthy matter floating on the surfaces, may prevent the perfect junction and incorporation of the two streams.

It is a common practice to pour hot metal into a cold mould, or into a mould that has been warmed on the surface by pouring a small quantity of the fluid metal into it, and then, by some contrivance, letting this metal run out again before it has had time to become solid. This plan will give a momentary warmth to the surface of the mould, or perhaps may warm it to the depth of half an inch; but it will not prevent the hot fluid metal when poured in from becoming solid wherever it touches the mould, while the interior of the mass will still remain in a liquid state. Under such circumstances the cast will be tolerably fine-grained, solid, and compact, where the metal has first cooled,—that is, wherever it has come in contact with the mould; but inside, where the fluid metal has not been so immediately cooled, but has remained longest in a melted state, the texture will be open, coarse-grained, porous, and highly crystalline.

If it is the general opinion that no better form for bells can be introduced than that which has been in use for ages, namely, the various modifications of a hollow cup-shape, we must endeavour to find some mode of improving the contour, and process of manufacture, so that cracks in the bells, and destruction of the towers, together with many other vexatious incidents, may be much less frequent than heretofore. Whatever the general external and internal form of a bell may be, the plainer the surfaces the better will be the sound. All mouldings, inscriptions, dates, and every kind of ornament, whether projecting or indented, should be avoided, as they interrupt the free vibration of sound, in proportion as the relief is high or low, and are therefore worse than useless on an object that is intended to please the organ of hearing infinitely more than that of seeing. A small bell finished in a lathe will sound better than one rough from the mould.

To produce a sound, bells are usually struck by a clapper within, or by a hammer on the outside. Such continued battering upon a cast or crystalline substance must, sooner or later, crack the metal. This may happen when the bell is quite new, soon after it is placed in the belfry, or not for several centuries. A number of comparatively insignificant hammerings or concussions will produce a very surprising effect if continued for a long period. The fracture may at first be so trifling as to be almost inappreciable by the most refined ear; but every stroke of the clapper will increase the evil, until the vibrations of the metal are so interrupted that, instead of a long-continued harmonious sound, an unpleasant jarring noise is produced, and the bell becomes useless. Mr. W. L. Baker's plan, proposed in his paper on Bells,* of gradually turning the bell round, is a great improvement.

The loudness of a bell will depend upon many circumstances in addition to its magnitude, weight, or the violence with which it may be struck. A calm and frosty atmosphere is favourable to the transmission of sound: violent winds and other aerial agitations interrupt its progress. When a strong wind blows from the hearer towards the sounding body, a sound often ceases to be heard, which would be distinctly audible in a calm.

Various circumstances have led me to consider whether a totally different form from that usually given to bells might not be introduced with advantage. Large blocks of stone are sometimes accidentally placed so that they balance on a small lump, immediately under their centre of gravity. While in this position, if they are struck with a heavy piece of wood, a deep sonorous tone is produced. On the same principle, a number of long strips of hard stone, of different sizes, are hung on two tapes, forming a rude instrument called the "Rock Harmonicon," which, when struck with a soft hammer, produces very harmonious sounds. Clappers and hammers are generally too hard: vibration is required, not harsh collision.

Solid masses of metal, formed in a particular shape, and suspended in a certain way, when struck with a hammer, will give very melodious sounds. For example, suppose a perfectly sound lump of soft steel be forged in the shape of a spindle, or of two cones of the same diameter but of unequal heights, and united at their bases,—each cone bearing a relative proportion

* By Mr. C. H. Smith, honorary member. Read at the Ordinary Meeting of the Royal Institute of British Architects, Jan. 14th.

* See page 129, Vol. XIII.

to the other, either in its cubical contents or superficial area,—the larger one to be three, four, or five times the size of the smaller: suspend this at the largest diameter or nodal part, by two pins or trunnions, and strike it with a hammer near the centre of gravity of the whole mass,—it will vibrate freely, and give a long-continued musical sound. Or take two pieces of metal, formed precisely of the same shape and dimensions as the last, one of soft steel, the other of bell-metal, and suspend them in a similar manner. If these two be struck at the same instant, either with a hammer or against each other,—care being taken that the striking point is near the centre of gravity of each,—the sound will be a loud musical chord, of a very harmonious kind.

Different experiments lead to the inference that coarse-grained, crystalline substances, are not so sonorous, and fit for the transmission of loud musical sounds, as those which are of a closer and more compact texture. Glass is extremely sonorous, and the sweetest tones may be produced from it. For this reason it is probable that if, instead of fusing and casting them, bells could be manufactured by hammering the metal into the requisite form, the same intensity of sound might be obtained from a much smaller quantity of it. Of course the manual labour of beating a ton of metal into the required shape would be very considerable; but if one ton of beaten metal be made to answer the purpose of four tons melted and cast in a mould, there would be a saving of at least 300*l.* in the cost of the material, which sum would be more than sufficient to pay for the hammering; and a bell so formed could not easily be cracked, nor would the tower be so heavily laden. The well-known Chinese gong is, generally, an instrument remarkable for its rudeness of manufacture and thinness of hammered metal; but when struck with a soft hammer it gives a deep bass tone, louder than can be obtained by any other means from the same quantity of metal.

I am prepared to hear it stated, that some of the sounds which may be very satisfactory on a small scale, and suitable for the interior of moderate-sized buildings, for high towers in cities, or open countries, would be almost useless. I have my doubts as to the correctness of these objections, especially to such as have not been fairly verified by experiments on a large scale, and thereby proved to be failures. The sound of some musical instruments, as the harp, for instance, is not over-powerful in a good sized-room, and not louder than a pianoforte, or violin, when in concert; yet, during a quiet evening, or early in the morning, its melody may be distinctly heard at a much greater distance, and long after other instruments have ceased to be audible. The same remarks are applicable to the beat of a common military drum, which is distinctly heard at an immense distance. Two pieces of metal, of a sonorous kind, one, probably, only half the weight of the other, but of the same form and proportions, will give the same, or very nearly the same sound. Taking this latter, and many other circumstances into consideration, it must be evident that the entire subject should be thoroughly investigated, especially at the present time, when we have a grand building at Westminster nearly completed, with a clock-tower waiting for its bells, one of which is to weigh 14 or 15 tons, and the prime cost of the metal only, for this one bell, cannot be estimated at less than 1,700*l.* When I hear of a work of this kind progressing in the middle of the nineteenth century without any improvement on the old system, I feel that the credit and character of scientific men is involved in the transaction. For, if they would turn their attention to the subject, it is not only possible, but extremely probable, that some plan might be discovered to answer the purpose of these ponderous bells, with perhaps half, or one-third of the quantity of metal, much less risk and difficulty of ringing, much less weight in the tower, and much more credit to all parties concerned in the great work.

Were I to present a peal of six or eight large spindles, or double cones, such I have described, to be suspended in the bell tower of the new church at Hanwell, I might expect to be sent after them, to the neighbouring asylum, for supposing that the churchwardens or bell-ringers were clever enough to ring the congregation to church with what might be mistaken for the clappers only. But surely, in these days of invention, when we live, as it were, in an atmosphere of steam-power, — when our words are sent, almost as quick as we can utter them, to the further end of a wire hundreds of miles in length, — when the portraits of living creatures, topographical views, or other complicated objects, can be produced in an instant by a flash of light, with such truthfulness and minute accuracy as to defy microscopic criticism,—it cannot be too presumptive to expect that, after a lapse of many hundred years, with the help of philosophic investigation, and mechanical science, we should be able to suggest some modification between the old ponderous bell, and the thin, loud-sounding gong, between the sweet notes produced by a musical snuff-box and the spindle-shaped steel which I have exhibited this evening. I will, therefore, conclude with the hope that some hints may be taken from my remarks, and that the discussion, which I trust will now follow, may lead to such experimental investigation as may ultimately change the present inconvenient, dangerous, and expensive system of bell-ringing.

In the course of the discussion which followed,

Mr. Cornelius Varley, visitor, said, the subject of bells divided itself into two parts: one, how to obtain a good bell and the fullest sound with the least weight of metal; and the other, how to support the bells and obtain the most of their sound with the least injury to the building: this was the architectural part. With respect to swinging of bells, Mr. Smith was right: whilst swung in open space there was no increase of sound, but it varied as the mouth was swung to or from the auditory. This opened the architectural question; for, whilst the bell hung quiet, it presented its best sound to the rough floor of the belfry, and spread it round into the corners, all serving as dampers, and a portion rushed out of the openings, where it was again cut up by the weather-boards. A bell so smothered by the inclosure needed to be much heavier, because we obtained but a portion of its sound; but if the bell were swung (though there was no increase of sound), it alternately presented its mouth to the two opposite openings, at which moment a larger proportion of sound was thrown out, and the discordant effect of its inclosure was lessened; and thus, by swinging, we only lost less of the sound; but this swinging was communicated to the tower, and were it not for the discordant proportions of all the parts, a spire would be seen to vibrate, yet all the parts trembled. The late Mr. W. Hardy contrived an inverted pendulum to show whether chronometer supports were firm enough, and it showed that many swung right and left with the pendulum, and so prevented any very accurate adjustment. Bells, being so much heavier than pendulums, will rock their tower, and Mr. Hardy's instrument could be adapted to show it, and probably would prove it to be more than any important building ought to be subjected to. An architect having produced a handsome building to endure the roughest weather, ought not to be required to spoil its proportions by any increased bulk to make way for and support a hidden agent, whose action is so inimical to durability. If bells were hung in the open air, over the conical roof of a tower or support suitably constructed for moving such weight, the cone below would spread their sound right and left; and if the cover were a large sounding-board, we should obtain the most effect from a given weight of metal. In cast bells, there was not only the rough surface, but inequality of thickness, a cause of discord inimical to the sound, and lessening its duration. This, in large bells, was very difficult to avoid; and, in thick castings, the two surfaces cooling first, often left a division within: this is a still greater cause for bad sound. The difficulty of ensuring sound metal in bell-casting was very great, as it was generally sound on the outside only, but crystalline within. In his own experience, he had found that metal cast in a hot mould cooled with a crystalline interior. Lord Rosse, by casting on a cold face, had succeeded in getting a sound mass all through. This question, however, concerned the bell-founder rather than the architect.

Mr. C. Barry begged to inquire of Mr. Warner, who was present, whether there was any mechanical difficulty in the way of counteracting, by some kind of equipoise, the effect of moving violently so large a mass of material as a church bell. This method was applied to some of the heavy machinery in the Cornish engines with success. Of course, the effect upon the masonry of a bell tower by the mere vibration of sound, was a different thing, and the amount of dislocation so produced was inevitable.

Mr. Warner said, there was no mechanical difficulty in the adoption of a mode of equipoise, which was indeed frequently done with small bells; but it would interfere with the ringing of changes.

The Rev. W. Taylor, visitor, referred to his statement last year, that the great bell of York had never been rung to set. That statement had been contradicted by Messrs. Mears, who wrote, that it had been *rung up to set* by sixteen men. He (Mr. Taylor), had, however, sent to York for an official report on the subject, and the report was, that the bell had never been rung up to set. He was himself at York in October last, and found that, in fact, although thirty-six men had tried it, the bell had never been rung to set; as indeed with the present hanging it never would be. At York, there was ample strength in the tower for any bell to swing, whatever might be its weight. At Erfurt, the tower was very thin, but there the bell, which weighed 275 centner (each 110 lbs.), was rung up to *set* by twenty-eight men. The latter bell was not cut into the stock as at York: the latter method took from the centrifugal force, and made it impossible to get up the bell. The bell at Erfurt was 5 ells in height, and 15 ells in circumference, the ell being 2 $\frac{3}{10}$ feet English, and it was cast in 1497. The different sounds of different metals was an interesting question, and on that point he would remind the meeting, that at St. Nicholas, Hamburgh, very large tuning forks of cast iron were struck instead of bells. Mr. Smith had shown that a common mason's chisel would produce a pleasing tone, but that the note of two such chisels was the same, although one was only half the weight of the other. How then was a deep tone (such as that of St. Paul's bell) to be produced, if increasing the quantity of metal would not effect it? The note of the Erfurt bell was F, but he believed Mr. Denison expected to pitch the Westminster Palace bell in E. The continuance of the sound, and the power to be heard at a great distance, were the principal tests of a good bell; and the latter object would be promoted by hanging bells, as in Italy, on the outside of the tower, instead of enclosing them with louvre boards, &c. This point appeared to have been overlooked at the Palace of Westminster, where the outlet for the sound was exceedingly small as compared with the size of the bell.

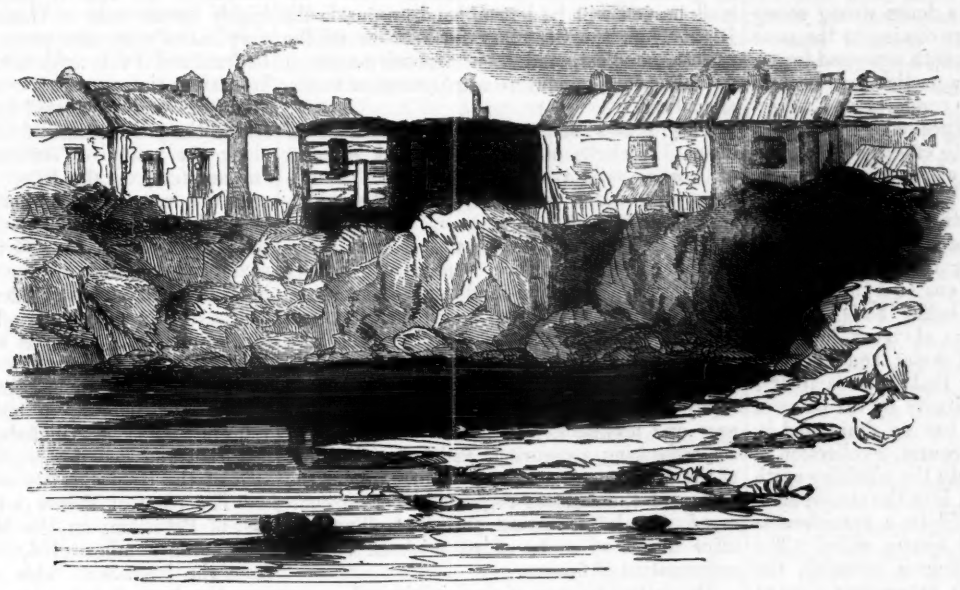
Mr. B. Denison, visitor, having been invited to state his views on the subject, expressed the interest he felt in it, as having been obliged to give directions for casting the large bells for the Westminster clock. He considered himself, however, only a learner at present, and was anxious to gain all the information he could by this discussion. The subject would afford ample scope for another discussion, and, whilst expressing his obligation to Mr. Smith for his remarks, he could not concur in the whole of his deductions. He should be glad to state how far he agreed with Mr. Smith, and how far and why he disagreed with him; but there would probably be hardly time for him to do so on the present occasion. The further discussion was accordingly adjourned to the 28th inst.

THE POTTERIES AT KENSINGTON.

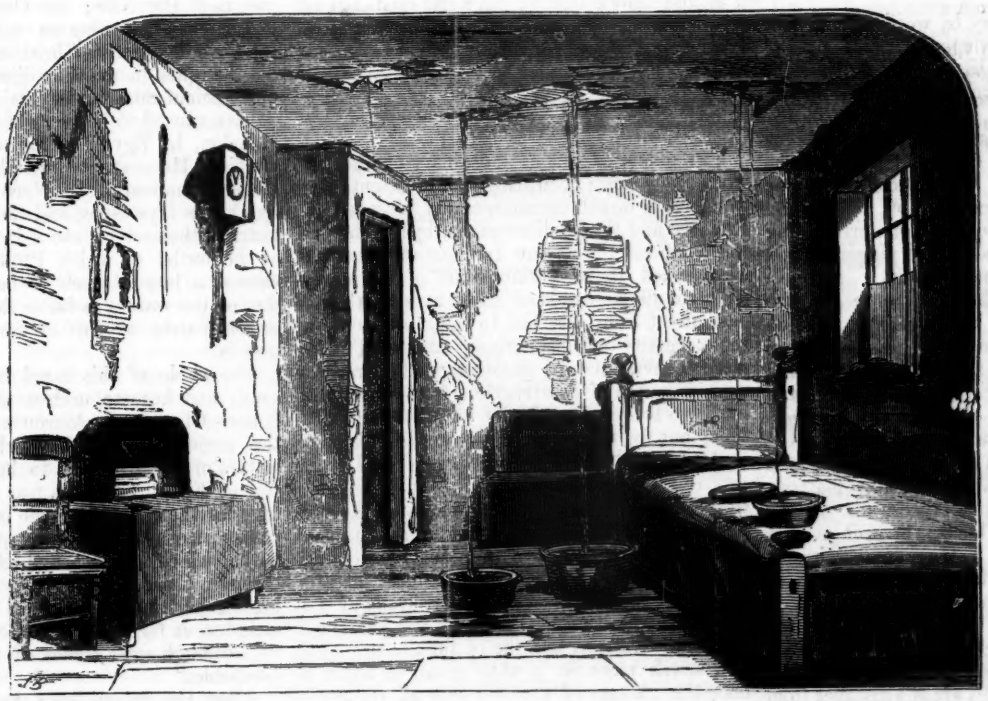
THIS singular and neglected locality has at various times during the last few years been brought under public notice. As, however, it is still to the multitude one of the unknown skirts of the town, we will wend our way in that direction, towards what was not long since the "pleasant village of Kensington, about two miles west of London." Passing the church, a building containing many interesting memorials, but not remarkable for beauty (the bells, however, ringing merrily), the road up the hill brings us to the Notting-hill road. On reaching this, long streets of stuccoed houses run in all directions from Kensington-gardens, leading to squares, crescents, and terraces, respectably inhabited. A great number of houses are still in progress, and before half-a-dozen years have passed, the monster London will have established a great branch in this direction.

Wandering in search of the district surgeon through the locality to which we have referred, we were recommended by a clergyman to take the second turning down the Drayton-road, where, this gentleman said, "You will find a place which, both in a moral and sanitary point of view, is as bad as anything you will meet with in the *Potteries*." Proceeding in this direction, we overtook a policeman going home, after a long turn of duty. He said truly enough, "The houses in the Potteries, and in other parts of London for the poor, are very bad, but they are not all bad people who are driven into such places. I have seen a good deal of these things, having been sixteen years

PLEASANT PLACES.



The Water's Side at the "Potteries."



"Just dropt in."

in the force, and never, to my certain knowledge, has there been such a difficulty in getting a shelter for a family as now: for my little house I have for some time past paid 6s. 6d. a week. The married men in the police, in consequence of the present rate of provisions, have a struggling time of it: we can hardly live but in the sort of crib I have here."

It was a small house, containing two rooms of a fair size, and some closets: although it had not been long built, the materials were so bad that the plastering had fallen off a large portion of the walls and ceiling: they were obliged to put tubs and basins in all directions to catch the water which fell through when it rained. Our sketch shows the aspect the room presented during a storm.

Inquiring on the way to the *Potteries* in the Notting-hill district, we heard many complaints of the drainage. A builder engaged in rearing a number of houses, was of opinion that the whole drainage had been done without sufficient plan. When he was at work the rain was about level with the floors of the kitchens. During storms of rain many of the houses were overflowed with water. This is the case in the Royal-crescent, where the houses have cost large sums. The cellar of a beershop in this neighbourhood was so deeply flooded by the sewer, that the empty casks floated and lifted up the floor of the rooms above. We were told, that in some instances the drains had been altered in their levels more than once, entailing expense on the house-owners.

Hemmed in on two sides by buildings such as we have described, the traveller this way will find the *Potteries*, as it is called, planted on a portion of a large extent of flat pasture-land, on which the operations of the builder are here and there indicated. Those who are acquainted with the old well-earned reputation of the Vauxhall Potteries over the water, naturally from the name of the place expect to find it occupied by a colony of those useful workmen. It is not, however, so; for, with the exception of the works of Mr. Adams, who is chiefly engaged in the manufacture of draining-pipes, tiles, and flowerpots, there seems to be no other manufactory of the kind in the neighbourhood. The sight of draining-pipes is always pleasant, and when looking at them stacked in quantities, we feel a strong desire to set a thousand little spirits to work to lay them in certain places which we too well remember. Here, however, are some of the inhabitants of the Potteries, one of them a decent-looking costermonger, who, in answer to our inquiry respecting the health of the place, says: "I think the place is very wholesome. I have lived here more than twenty years. It does not agree so well with strangers. The district doctor lives a long distance from here. We have sometimes fever, but I don't think that is the air. People are rather short of food. It is true that a short time since three children died in one house of fever, and there was an inquest held; but, sir, people just now are short of work, and the supply of victuals is scant. I don't consider it an unwholesome place. Pigs, sir! What harm can they do?" Such, generally, we find to be the opinion that dwellers in the worst sanitary positions state, in spite of their own convictions: it must, however, to a certain extent, be admitted that those who have been born in unfavourable localities do occasionally, if they escape the dangers of early years, live with impunity in atmospheres which would destroy strangers.

In a part of the Essex marshes which during

a considerable portion of the year is to a great extent hidden by fogs and moisture, we have seen families—one in particular—reared in the fens, consisting of nearly a dozen strong young men and women: strangers coming to the same locality would be stricken with ague and fever: in the cases alluded to, the parties have been in the possession of all the comforts and necessaries of life, a circumstance which has to a certain extent kept off the effects of the dangerous atmosphere by which they are surrounded.

The most striking feature of the Potteries district is an excavation of great extent, made by the removal of clay for the manufacture of tiles, &c. At the time of our visit the water in the pool was considerably below the level of the road and streets adjoining: at times, however, this great hollow is full of water, and so extensive does it then appear that it is familiarly known amongst the inhabitants by the name of "The ocean:" this pool has no drain, and is, therefore, as a matter of course, a collection of stagnant water, settling into the adjoining earth or passing by absorption into the atmosphere. This foul lake is bordered to a considerable extent by the streets and houses called "The Potteries," which in a degree resemble the hovels which have been so extensively planted in Agar-town: the former have, however, an advantage over the latter in a sound road, which has been formed through the place by the parish.

It is difficult to convey by words an idea of the dilapidated and filthy appearance of some of the houses on the north bank of what, for want of a better name, we are obliged, like the inhabitants, to call "the ocean." Some of the dwellings are not houses at all, but caravans which had become too old for service at the country fairs, and were here placed in a line with the ill-shaped erections of bricks and mortar: adjoining these, in fact surrounding them, were the thickly-populated piggeries, and their unwholesome accompaniments.

Leaving the foul banks of "the ocean," the streets which compose the Potteries stretch towards the north. Many of the houses are in tolerable condition, and the roadway, although not good, infinitely superior to the deep and almost impassable mire of the roads in Agar-town.* It is easy, however, to observe the dangerous accumulation of water and filth, the overflow of cesspools and such like matters, standing in pools against the walls of the houses. Some of the houses present a most dilapidated appearance. One in particular, surrounded by a mud fence, equals many of those sheds which, in parts of Ireland, so much pain the eye. On the outskirts, under the shelter of a wall, several gipsies were comfortably encamped. The gipsies seem to have the best of it: they have no pigs: they are at a distance from the putrid gutters and other refuse, and ready at an hour's notice to tramp off to a more favourable site, if the health of the neighbourhood becomes affected. In the course of a few years, the houses which form the neighbourhood called the Potteries will have vanished, and perhaps the name be altogether unused; and those living in the handsome dwellings which may then occupy the site, will not be able to form an idea of the scene now presented by "the ocean,"—piggeries, cavernous dwellings, ruined cottages, and gipsy encampments.

* The condition of the roads in the above district is really shocking. So extraordinary is the depth of mud, that it is almost worth while to make a short expedition to the place in order to witness such a scene in the metropolis. We hope that the fresh management may, like a new broom, cleanly sweep these rather neglected thoroughfares.

THE BARRACK BOARD.

THE formation of a Civil Architectural Barrack Board being talked of, the public may like to know there is now in existence a staff for the construction and repair of barracks, &c. consisting of about 300 military engineer officers, at an annual cost of nearly 200,000*l.*; attached to which, according to the ordnance estimates for 1855-6, there is a professional civil branch, costing the country annually about 76,000*l.*; and the Government are no doubt in a quandary as to what ought to be done with this huge and costly permanent engineering staff. Most likely the military branch will be employed on military duties in the field, leaving casualties to gradually reduce its numbers, whilst the civil branch will be left on hand, to puzzle the Right Hon. the Secretary for War as to the easiest, simplest, and least expensive mode of providing for their future employment or superannuation.

This professional civil branch consists of about 127 clerks of works, and 154 foremen of works, with a surveyor and two deputy-surveyors, and a teacher of practical architecture at their head.

The foremen of works have charge of the outdoor superintendence, and are generally superior in education and practical experience to clerks of works in civil architectural practice; whilst the clerks of works (who pass a stringent architectural examination) are for the most part employed in the office, and invariably perform the daily duties of a civil engineer and architect, together with the whole of the estimating, measuring, and financial affairs of the department, acting, of course, under the orders of the military engineer officer in command, the latter acting and controlling the office duties so as to afford a check on any malversation of finance.

The future disposal of this civil branch seems now to be a somewhat difficult and expensive matter; and, although the war minister may be able to put the "right man in the right place," it is well known that he has quite mistaken the position and duties of the civil branch of the royal engineer department.

THE ISTHMUS OF SUEZ MARITIME CANAL.

THE object of this extraordinary engineering work, now again occupying public attention, is to effect a direct communication between the Red Sea and the Mediterranean, by the shortest route across the narrow Isthmus of Suez. It is intended to be a ship canal of the largest size, to allow vessels of 1,500 tons burthen to pass direct from one sea to the other, without the necessity of discharging cargo. For the mere conveyance of passengers, the railway now in course of construction, from Alexandria by Cairo to Suez, would be ample accommodation; but for the transport of merchandize, the unshipping at Suez, transport across the Desert, and re-shipping at Alexandria, is rather too slow work for the rapid exigencies of the present time. It must also be borne in mind that the traffic to the East is continuously increasing, and in process of time will demand greater facility of transit than the Desert Railway will be able to afford: for light goods and passenger traffic, the railway will be of infinite use: but how much more so a ship canal to admit at once the passage of a vessel with all its goods and passengers on board.

It will shorten the distance of the northern parts of Europe by 3,000 leagues; and for the Mediterranean ports by at least 3,400 leagues. It will be far the most direct route to British India;—not only the shortest, but the safest, notwithstanding doubts expressed to the contrary by interested parties.

The idea of this grand canal is not by any means a new one. It is, in fact, only the revival of what has been once already achieved on a smaller scale, in what is called the Dark Ages. When Great Britain was a wilderness, and its painted inhabitants as wild and uncivilized as the aborigines of Australia, the idea of this canal had attracted the attention of the then civilized world.

All the great men who have swayed the sceptre of Egypt have recognised its practicability, and wished for its execution. It has been done, neglected, forgotten, disused, and finally choked up, so that at present its trace alone remains: history has preserved its name on her page, and that is all that remains of its former glory and utility.

Sesostris, Alexander the Great, Julius Cæsar, Amrou, the Arab conqueror, Napoleon, and finally, Mehemet Ali, have all more or less considered the question. Julius Cæsar little dreamt in his day that Gauls and Britons would tread in his footsteps, and league together to investigate and endeavour to carry into effect the bold ideas that once occupied the serious attention of his imperial mind. The site is scriptural as well as historical. The once highly fertile vale of Goshen touches on the very line of route now proposed, and may again be fertilized if this noble scheme be carried out. In ancient times, as above stated, the Nile and Red Sea were connected by means of a canal; and at the present time a fresh-water canal flows along the valley of Tornilat, or the vale of Goshen, fed from the Nile.

It was in existence for about a hundred years, to nearly the middle of the ninth century before the Hegira,—then for a further period of 445 years, commencing with the first Ptolemies, the immediate successors of Alexander the Great; and lastly, for a third period of 130 years after the Arabian conquest, as stated by Monsieur Ferdinand de Lesseps, in his memorial to Mohammed Said, the present Viceroy of Egypt.

Monsieur Lebeau, in his "Histoire du Bas Empire," quoting Albufeda, Prince of Syria, historian and geographer, living in the 753rd year of the Hegira, states as follows:—

"The coast of Farma (a town a little to the east of Pelusium, on the Mediterranean) was only seventy miles (106,000 metres) distant from the Red Sea. This space was a very smooth plain, slightly elevated above the level of the two seas.

Amrou formed the design of uniting them by a canal which he would have filled with the waters of the Nile; but Omar having opposed it, for fear of opening an entrance into Arabia for the ships of the Christians, Amrou turned his thoughts in another direction. There was one ancient canal called Trajanus Amnis, which Adrian caused to be brought from the Nile near Babylon, in Egypt, as far as Parboëtus, now Belbis. He met at this place with another canal, commenced by Nechos, and continued by Darius Hystaspes, and the two together discharged themselves into a lagoon of salt water, at the outlet of which Ptolemy Philadelpheus caused a large trench to be made, which conducted the waters as far as the town of Arsinoë or Cleopatris, at part of the gulf where Suez now is.

The whole of this canal being filled up with sand, had become useless at the time of the famous Cleopatra. Amrou was not deterred by the ancient prejudice which, supposing the waters of the Red Sea to be higher than the soil of Egypt, created a fear of opening a passage for them, and he made it navigable for the transport of the corn of Egypt into Arabia. It is that which is now called Khalig, which passes through Cairo, but only goes as far as the lagoon called the Lake of Sheib. The remainder, as far as the Red Sea, is entirely filled up, although some traces of it are still distinguishable."

After the enterprising Amrou came Sultan Mustapha III. who intended to execute a canal direct across the Isthmus of Suez, when peace offered him the necessary leisure.

From this brief sketch it will be seen, that in remote times the execution of this canal has occupied the attention of the various masters of Egypt. Great historic names are associated with this narrow strip of land: ancient engineers have passed away: their works and records have followed: it now remains to see what newer nations and a different race of men can do: if they can carry out the bold ideas of engineers of ancient times.

During the occupation of Egypt by the French, under Napoleon, the site of the old canal was traced by the academicians and engineers attached to the expedition, including Monge, Berthollet, Lepère, and others equally eminent. Napoleon himself appears to have taken great interest in the matter, for he more than once alludes to it in conversation with Las Casas, O'Meara, and others of his memorialists at St. Helena.

Napoleon states in one conversation—"The ruins of the canal between the two seas are well defined. The two banks are about twenty-five terses apart. A man on horseback would be hidden from view in the middle of the canal." Berthier also found traces of the canal traversing the Oasis, which formerly carried water from the Damietta branch of the Nile to Bubastes, on the Pelusian branch. The re-

mains of this canal have the same dimensions as that near Suez. O'Meara records the Emperor's description of his own plan.

So far we have had the opinions and ideas of Napoleon, a man essentially practical. He believed in the easy completion of this work: he examined the ground himself, with his staff; and all concurred, both in its utility and facility of execution,—and this, notwithstanding the strange error committed in the levels.

The French engineers, after taking a series of levels, arrived at the conclusion that there was a considerable difference between the respective levels of the Red Sea and the Mediterranean, and for awhile this error was received as a great fact in geography, and became a great puzzle to writers in physics.

The difference of level between high water at Suez and low water at Tineh was reported to be 9 metres 90 centimetres. This reported difference of level gave rise to great discussion among the engineers and geographers of Europe: it was explained on physical and geographical principles, became altogether doubted, carefully tested, and finally proved to be the result of instrumental or clerical errors in the process of taking the levels. The errors are not surprising when we bear in mind the circumstances under which the levels had to be taken,—amid the stirring scenes of war, through hostile tribes of Arabs always on the look out to catch a stray infidel or two, amid the bustle and excitement of marches, countermarches, and skirmishes. As the engineers had to run the gauntlet of a whole host of dangers in taking their levels, it is easy to suppose they had but little opportunity of taking check levels for verification. Many of the observations were taken by the water-level.

It would scarcely have been worth while to allude to these errors had it not been for the discussions, doubts, theories, and mystifying explanations they gave rise to, in the grave, but busy world of science.

Many travellers interested in this important question visited the Isthmus to investigate this phenomenon: amongst others some English officers arrived on the spot and commenced a series of observations with the barometer, and afterwards by the boiling-water process, and, as a result of their interesting labours, reported that they had not been able to find any appreciable difference between the level of the two seas.

It now became necessary to settle this important point, and re-open the whole question, test the various conflicting statements, and put an end to all doubts on the subject.

In the year 1847, a society, "established for the investigation of the Suez canal," at the head of which were MM. Négrelli, Robert Stephenson, and Talabot, caused a new survey of the whole country to be made by experienced French engineers, under the superintendence of M. Bourdaloue, a gentleman well known for his acquirements and practical knowledge in these kinds of investigations.

The surveyors were provided with the best instruments in use, with all the most recent improvements. Thus equipped for the campaign, they commenced operations under the best auspices. In addition to this, they were assisted by a brigade of engineers furnished by the viceroy of Egypt, and also by a company of artillerymen, who assisted in the various operations.

The surveying party was divided into several separate divisions, each working independently of the other, thus affording facilities for separate verification of the work of each division, where necessary. The results of these operations were reduced, and published in a report in 1847, by M. Talabot, which clearly established the errors committed by the engineers in the expedition under Napoleon; yet so high was the opinion entertained of the *savans* who accompanied Napoleon, that many still remained incredulous, and doubted the existence of any such difference between the two series of operations.

To extinguish these contradictions, a second verification was undertaken in 1853 through the active instrumentality of M. Sabatier, consul-general of France in Egypt, the operations in this case being conducted under the direction of Linant Bey and Mougel Bey, the viceroy's engineers. The result confirmed the operations of 1847, and satisfactorily proved the error of the surveys made in 1799.

The new series of levels only differ o. met. 1814 from that taken in 1847, and give as the difference of level between the "station on the quay of the hotel at Suez and low water in the Mediterranean, 2 met. 4286, instead of 2 met. 6100, found by the operations of 1847," giving a difference of only o. met. 1814, a little more than a centimetre and a half, being less than three-fourths of an inch in a distance of 90 miles.

Thus the question of levels is terminated after having rested in doubt and obscurity for nearly fifty years.

The level nature of the ground in the track of the proposed canal will be seen from the following figures, being four of the *highest points* in the whole line above the datum level of low water in the Mediterranean at Tineh, viz. 16 met. 5950, 7 met. 8210, 3 met. 8280, 11 met. 6300, these being literally the only elevations met with in a distance of ninety English miles.

On this subject, the memorial of M. Linant Bey and Mougel Bey, by way of precursory scheme, is very precise:—

"The levelling also shows, that by adopting 6 met. 50 for the bed of the canal, there will be a length of 18 kilometres in the Bitter Lakes, where there will not be a shovelful to remove, and for another 18 kilometres will be very little to do; and as these lakes are dry at a depth of 8 met. 39 below low water, all the earthworks for the whole length of them could be performed in the dry, if found advantageous to do so."

In my next I will endeavour to discuss the practicabilities and peculiarities of the line of canal as now marked out from Suez to Pelusium, with such other information on this great question as may prove interesting to the professional and non-professional readers of the *Builder*.

JOSEPH LOCKWOOD.

CHURCH-BUILDING NEWS.

Lincoln. — Some improvements have been effected in the church of St. Mary-le-Wigford, in this city, and the church, says the local *Chronicle*, is now well worthy a visit by the lovers of Gothic architecture. It is true, the ugly old pens of pews still remain, and so does the painted flat ceiling; but the oak roof will, before long, be exposed, and the old pews are to be displaced in due course, to give room to seats with doors.

Ely.—Steps are being taken to raise a fund for a painted window to be placed in Ely Cathedral, to be called "The Old Choir Boys' Window." The Dean and the Rev. E. B. Sparke have been consulted on the subject, and have signified their acceptance of a proposal to that effect. Many of the old choir-boys who have been applied to, have at once given their names as subscribers.

Wisbech. — The Church Restoration Committee here have accepted a tender from Mr. H. Ringham, of Ipswich, for the execution of the most necessary works in the parish church. The internal fittings are to be of the best wainscot oak, and the cost of the works to be included in the first contract will be 2,728*l.* 14s. There are other works which the committee would be glad to undertake, but which their now available funds do not justify them in attempting. These works include ornamental iron gates for the tower gateway and the south porch, an elaborate restored font cover, an ornamental and enriched ceiling for the chancel, a new staircase to the paroise, a ceiling for the vestry, &c. The estimate for these works is 713*l.* The following tenders for the execution of the *whole* of the works in wainscot oak were received:—

	With doors to the pews.	Without doors.
Mr. Henry Ringham, Ipswich ...	£3,511 0	£3,344 14
Mrs. Rattee, Cambridge	3,755 1	3,630 11
Mr. J. Whiting, Northampton ...	3,910 0	3,804 0
Mr. F. Ruddle, Peterborough ...	3,953 0	3,853 0

Blisworth.—The church of St. John the Baptist, Blisworth, was re-opened on Thursday before last, after being closed for about seven months, during which it has undergone considerable restoration. The roofs of the nave, north aisle and chancel, have been renewed: those of nave and chancel are high pitched, and covered with Westmoreland slates, graduated in size from eaves to ridge. In the chancel roof, the opening above the collar beam and the spaces between the arch ribs and principal rafters are filled with tracery of decorated character, and the arch ribs are finished on the under side with mouldings. The roofs are boarded, and the whole stained with Stephen's stain. A gallery at the west end of the church has been removed, and the tower arch thrown open and restored. On the west side of the tower, that which was formerly a decorated window has for many years been robbed of its tracery and mullions, and used as a doorway to a kind of ringing loft, with coal place underneath, and a wretched wooden staircase on the outside of the tower to ascend to the loft. The ringing-loft and staircase have been cleared away, the window and its tracery restored, and this, with the tower arches now thrown open, according to the *Northampton Herald*, presents a pleasing feature in the interior. The pews or seats have been remodelled, made low and open, and finished with seat-ends of uniform character throughout the church. The arches and piers of the nave and chancel have been cleared of many coats of whitewash, and the whole restored with stone corresponding with the original. The walls have been re-stuccoed, but not jointed. The woodwork is yellow foreign deal, stained of oak tint. The whole outlay, including architect's commission, is about 850*l.* The Rev. Wm. Barry contributed about 400*l.*: the parish subscribed 350*l.* leaving a deficiency of 100*l.* towards which 44*l.* 4s. 2d. have been collected. The works have been carried out under the superintendence of Mr. E. F. Law, of Northampton, architect.

Wheatley.—It was intended, according to an Oxford paper, to lay the first stone of the Wheatley new church on Tuesday last. The new and larger building which it is intended to erect after a design by Mr. Street, will be of great benefit to a large and poor population.

Leigh. — The ancient church in this small village having for a long time been dilapidated, it was determined to erect a new one, not a very easy task in a small agricultural locality. In addition to many contributions the parish made a rate to collect 300*l.*: 50*l.* were granted by the Incorporated Church Building Society, and a like amount was given by the Diocesan. The new structure is built of stone from the quarries of Sir B. Brodie, Bart. at Betchworth, with Bath stone facings, and has been erected under the superintendence of Mr. G. Larmer, of Reigate, architect. The interior woodwork is of oak, with panelling over the chancel, and carved bosses. The pavement is of Staffordshire tiles. At the east end is a stained glass window, presented by Mr. J.W. Freshfield, M.P. The designs have been carried out by Mr. Shearburn, of Dorking, builder.

Tewkesbury.—The plans for the burial ground and buildings for the new cemetery of this town and parish having been prepared by Messrs. Medland and Maberley, of Gloucester, the Board advertised for tenders for carrying out the work. Three only were sent in, the lowest of which was 300*l.* above the amount specified by the architects as the maximum sum to be spent. Mr. Medland accounted for this by additions to the plans. The architects were requested to reduce the cost of the works by omitting several parts of the building, and then to confer with those who had sent in tenders.

Devonport.—The local *Independent* records an untoward occurrence in reference to the new church of St. Stephen, in George-street, on St. Stephen's day. The spire had just been completed and the scaffolding nearly cleared away, when, in the midst of a heavy gale of wind, the top of the spire was observed to rock to and fro, threatening to topple over, much to the fear of the occupants of the houses in the immediate locality, who quitted their habitations in consequence. The gale, however, subsided, and the fears were not realized, though the apex of the tower, formed, it is said, of one piece of stone, several feet in height, and surmounted with a point of iron, was removed two or three inches from its position on the eastern side, where it now remains. A difficulty, it is said, has arisen as to who shall bear the costs of repair.

Nottingham. — On Tuesday before last the newly-erected church of St. Matthew, in Upper Talbot-street, which is visible as the terminal point of a great many views in the neighbourhood, was consecrated by the bishop of the district, in presence of a numerous body of his clergy.

Brighouse. — The Bradford *Observer* states that the new Independent chapel at Brighouse, in that vicinity, has been opened for divine worship. The chapel will hold 900 people, and has school-rooms attached. The cost of the buildings is 3,000*l.* of which only 200*l.* have to be raised.

Knockbreda (*Ireland*).—On Sunday before last, according to the *Belfast Newsletter*, the parish church of Knockbreda was re-opened for divine service, having been closed for upwards of sixteen weeks while undergoing repairs and alterations under the direction of Mr. Fullerton, the diocesan architect of the Ecclesiastical Commissioners for Ireland. The church has been newly pewed, also a new pulpit and reading-desk provided, and the chancel and communion-table newly modelled and arranged. The interior walls are stone-finished, and the church heated with warm water apparatus furnished by Messrs. Musgrave, of Belfast.

ST. SAVIOUR'S, SOUTHWARK.

THERE are many interesting things in *Sudwerche*, the South-work of London, but none so much so as St. Saviour's, the church of the priory of St. Mary Overy, notwithstanding the treatment it has received. It has a nave, transept, choir, and Lady Chapel, with a lofty tower at the intersection of the transept. The Lady Chapel, choir, transept, and tower, were restored some years ago, partly under Mr. George Gwilt, and partly under Mr. Wallace; but the nave, left for a time without a roof, was taken down and rebuilt in most incongruous and ugly fashion. The church, of which portions remain, was commenced in 1208, and these show how fine a specimen of the Early English style it was. The proportions of the original nave were pleasant to look at, and some of the sculptures were of much interest. With care, and some expenditure, the ancient nave might have been restored; and this church, which is only surpassed in the metropolis by Westminster Abbey and St. Paul's, might have been preserved intact for future generations. However, the old nave was removed, the present structure erected on its site, and certain liberties taken with the transept of the church; — the subject of our engraving, looking north. These unpleasant additions consist of large ladder-like, unsightly staircases, large galleries, and wooden partitions, which so clog up and disfigure the fine proportions of the transept, destroy the view from the choir, and are so contrary to good taste, that we feel inclined to state that nothing so bad is to be met with in London, and that is saying a great deal. We have in the view left out these erections, and hope that by some fortunate circumstance they may be one day removed.

The traditionary history of St. Mary Overy's and the ferryman's daughter, is too well known to need here particular mention: we may, however, note that a priory was originally established on this site, which was afterwards converted into a college of priests, but that, like the former institution, proving of no long duration, it was, in the year 1106, refounded by Norman knights and the Bishop of Winchester, for canons regular, and from its dedication to the Virgin Mary and its situation, was called St. Mary Overie, that is, St. Mary over the River.

This edifice was destroyed by fire about the year 1207: on this occasion, a great loss of life, estimated at from 2,000 to 3,000 persons, took place on London-bridge. In the ruined nave were a semicircular-headed door and some other portions of the old church, and a few years ago, after the present structure was again endangered by a great fire, another part, consisting of a semicircular apse at the north-east corner of the vestry, formerly St. John's Chapel, was brought to light. These fragments, together with some other circumstances, would seem to show that the church of the date of 1106 was situated on the north side of the present choir.

After the fire of 1207, a considerable portion of the edifice was rebuilt. Peter de Rupibus, Bishop of Winchester, added to the priory "a spacious chapel," which he dedicated to St. Mary Magdalene, and this being afterwards appointed for the use of the inhabitants, eventually became a parish church. The monastery, &c. was surrendered to Henry VIII. in the year 1539, when the revenues amounted to 624*l.* 6s. 6d. per annum, whereupon the inhabitants of the parishes of St. Mary Magdalene and St. Margaret, by the assistance of Stephen, Bishop of Winchester, purchased of King Henry the stately conventual church. These parishes in the year following were united by Act of Parliament, by the new appellation of St. Saviour's, and the churchwardens constitute a body politic and corporate, and the churches of St. Mary Magdalene and St. Margaret being laid aside, St. Saviour's has ever since been used as the parish church.

In the year 1611, King James I. for a valuable consideration, granted, by letters patent, to the churchwardens and parishioners in "free soccage," the rectory and parish church of St. Saviour, together with all the glebe lands, tythes, tenths, &c. in consideration of which the said churchwardens and parishioners are obliged to provide a fit house for a grammar-school, and to keep a good master to teach the children of the parish, paying to the said master, 20*l.* per annum, and to an usher 10*l.* per annum; and also to provide two able chaplains to preach in the church, and to pay them 30*l.* per annum each. These conditions were performed until 1672, when the said sums were found insufficient to maintain the officers mentioned: whereupon the stipends of the chaplains were raised to 100*l.* each, and the schoolmasters' to 30*l.* each. These provisions for religion and education have since been very considerably increased, and rendered more adequate to the exigencies of the times. We have mentioned this circumstance as one of many hundreds of examples, both in London and provincial towns, during the times of James I. Queen Elizabeth, and some of the succeeding reigns, of parishioners and corporations recognizing the necessity of promoting public education, and, considering the comparative numbers of the population then and at present, it is maintained by some, that proportionable effort has scarcely been made for the education of the poorer classes, although it must be admitted that St. Saviour's Grammar School is an excellent institution.

A few hours may be well spent in this church, either by the architectural student, or by those curious in old-world matters. There is an interesting monument to the poet Gower, consisting of a canopied tomb, effigy, and inscription. The figure of the poet is very fine, and was awhile ago painted and gilt (we believe under the superintendence of the late Mr. Etty, R.A.). According to Mr. Timbs, Gower was married in this church in 1397, by William of Wykeham! The burial register records, under the date 1607, the burial of "Edmond Shakspeare, player, in the church:"—he was the great dramatist's brother. John Fletcher (of Beaumont and Fletcher memory), was also buried at St. Saviour's, in 1625. There are in different parts of the church several quaint and curious monuments.

An ambitious monument in the north transept is to note the resting-place of a worthy whose

——"Virtues and his pills are so well known,"

that it seemed almost useless to hand his fame to posterity. It is, however, well for the fame of the pill-vendor, that it was just thought worth while to cut on the pedestal on which lies the effigy of the *doctor*, in flowing robe and wig, in most uncomfortable-looking attitude, an inscription and his name.

There are several monuments of about Queen Elizabeth's time, and a cross-legged figure of a Templar, without any inscription. Massinger, the dramatist, was buried here with some pomp, but no stone marks the place. In the Lady Chapel, one of the finest in the country, is a large tomb to the memory of Bishop Andrews, with some other matters worthy of note.

Some stained-glass windows, in memory of Protestant martyrs, have been put up recently in the Lady Chapel, and are effective as seen from the choir.

Chamberlain says that in his day, 1771, the remarkable places and things near the church were the Town-hall, the Clink Prison, the Dock, a good market, and the Lord Montague's house, in Montague-close; where was also the Lord Mounteagle's house, now or late of the estate of —— Overman, esq. In this close it is said the Gunpowder Plot was discovered by the miscarriage of a letter.

Near St. Saviour's Church, fronting the Thames, was formerly situated Winchester House. A building was first placed here by William Gifford, bishop of that see, about 1107, for his town mansion, and that of his successors. In Cook's "Views of London," a part of the palace, in which was a marygold-window, is shown; and it is only eight or nine years since a very picturesque fragment of this ancient dwelling was removed.

Nearly adjoining to Winchester House was the residence of the bishops of Rochester, which has been entirely removed. Close to the house of the bishop were the notorious Stews, established in the reign of Henry II. A.D. 1162, plundered by Wat Tyler in 1381; and suppressed in 1546, in the reign of Henry VIII. by proclamation of that king.

All vestiges of times as old as Shakspeare and the playhouses there seem to have vanished, except a house which some think may be part of the original Falcon Tavern. This is situated not far from the Falcon Glass-works. It is evidently of considerable antiquity. The preaching-place of John Bunyan near here is not now to be recognised. There are, amongst several good institutions near here, the almshouses founded by Alleyn, the player, and some other things worth hunting up.

COMPETITIONS.

Rugby Town-hall Competition.—We continue to receive complaints as to exaction of 2s. 6d. for particulars; and, more especially, as to the largeness of the accommodation required compared with the amount proposed to be spent. Writers ask, "If the cost is exceeded in the end (as it surely must be), who should have most blame, the penny-wise promoters of the scheme, or the architects who fraudulently furnish designs that they know cannot be executed for anything like the stipulated cost."

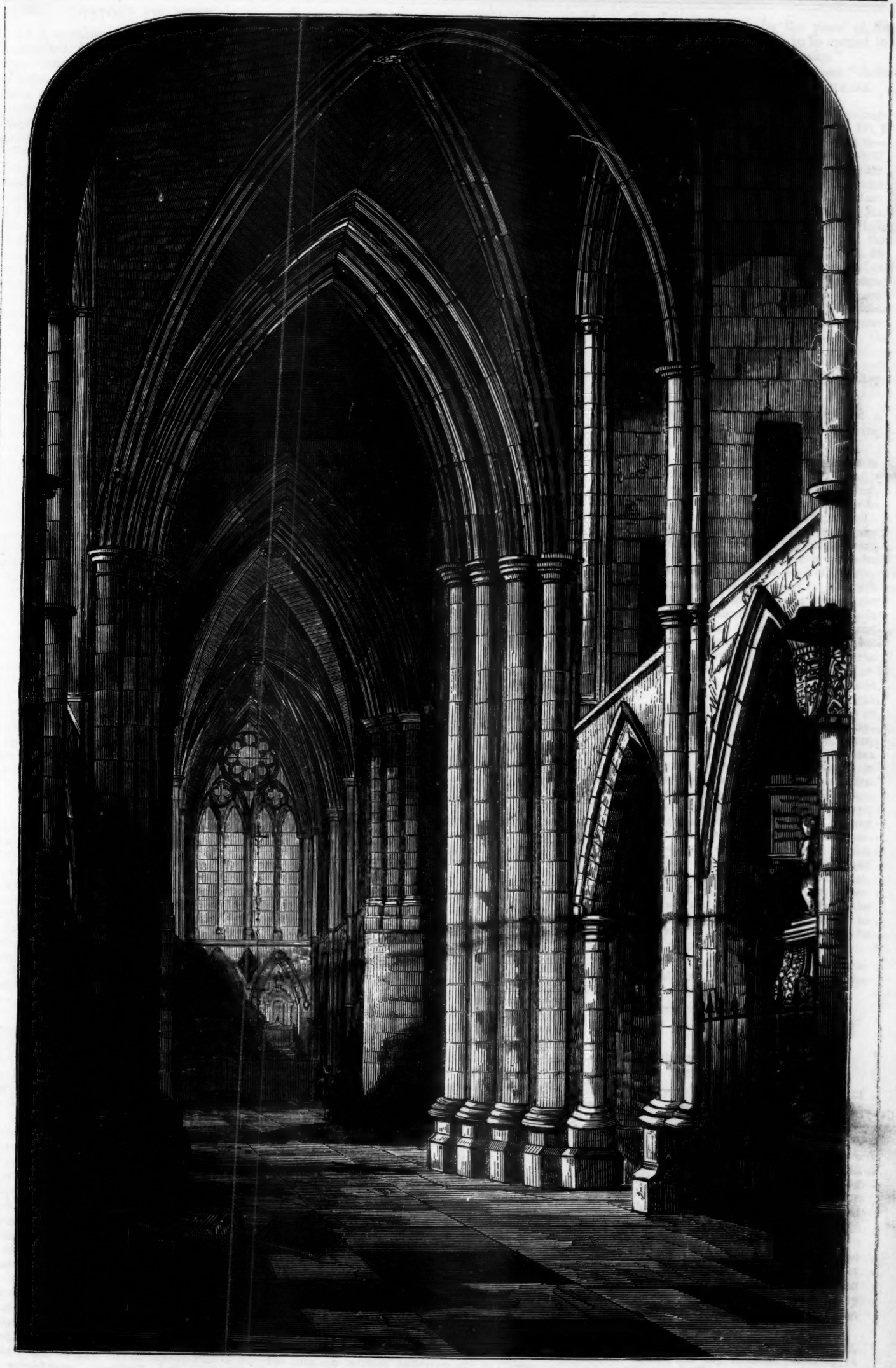
Middlesbro'-on-Tees.—The design of Mr. Oliver, jun. has been selected in competition for the new Congregational Church in Middlesbro', Yorkshire.

The Barracks Competition.—You have already suggested that the designs sent in for barracks in competition should be publicly exhibited. Pray, sir, raise your voice again in favour of the public having an opportunity of seeing the plans, and expressing, through the press, their opinion, as in the case of the Nelson monument. A fairer decision may then be arrived at, and the *people* have their *rights*, for surely they should see what they pay for, and each competitor may then see that the best design is chosen.—J. T. W.

Free Church, Glasgow College.—We learn that the Free Church General Assembly's Committee on the Glasgow College have selected the plan of Mr. Charles Wilson, architect, as the most eligible for the new Free Church College to be erected in this city on the site purchased in Lynedoch-street. Plans were obtained in competition, three of them from architects in this city, and one from Liverpool. The building will be in the Modern Italian style.

New Independent Chapel, Toxteth-park.—Out of several designs sent in for the new building, that of Messrs. Smith and Grundy, of Manchester, has been accepted. The style is that of the Decorated Gothic, the front view presenting a semi-octagon. Spacious school-rooms will be built on the ground-floor, together with a lecture-room and four class-rooms, all of which can be thrown open for public meetings. Behind the edifice a vestry will be erected in continuation of the building, and in conformity with the style of the chapel.

GLASGOW ENGINEERS IN PORTUGAL.—It having been determined to introduce water by gravitation into some towns in Portugal, says the *Glasgow Gazette*, Mr. D. Mackain, C.E. has been consulted as engineer, and has just returned from Portugal after a preliminary inspection. Mr. William Kyle proceeds immediately to take the requisite surveys and sections.



ST. SAVIOUR'S, SOUTHWARK: THE TRANSEPT, LOOKING NORTH.

HISTORY OF KEYS.

AT a meeting of the British Archæological Association, held on the 9th instant, Mr. H. Syer Cuming read a paper on the History of Keys. He pointed to a strip of bark and a thong of leather, as the first means by which property was secured, prior to the advanced stage of social refinement when permanent houses were constructed, and the door and the coffer fastened with bolts, latches, and bars. Homer was cited as the earliest writer who mentions anything like a key, and special reference was made to the primitive locks and keys of wood of the ancient and modern Egyptians. The iron keys of Egypt were described, and illustrated by examples from Thebes, and the curious fact pointed out that nearly similar specimens are met with in Western Africa. After a brief notice of Greek keys, attention was directed to the Roman era, and a minute description given of the fixed and movable locks, the dentated, piped, and broached keys, and of the variously-formed bows surmounting the stems. Mention was made of the small keys attached to finger-rings, and of the *clavis adultera*, the false or skeleton key of the Roman housebreaker. The Anglo-Saxon and Norman keys were then dwelt upon, and the various forms and fashions of the key-bows from the thirteenth century down to a later period were described. The superstitious belief in the magical powers of the key, of its employment as a heraldic bearing, and its frequent adoption as a sign in former times, were next alluded to; and Mr. Cuming concluded his paper (which was profusely illustrated with examples of keys of all ages, from the days of the Egyptians to those of George IV. as shown in the key of the late Carlton House) by enumerating the different modes by which keys have been held together, showing that a ring was among the earliest as well as latest contrivances for the purpose. It was remarked, that two objects were frequently found appended to the keys of the doors of stables and cow-houses, namely, a perforated flint and a horn; the former of which was declared to be an amulet to guard the creatures from the attacks of nightmare, and the latter, an emblem of the good Pan, the protector of cattle, and hence regarded as a charm, and both of which have been used from the most remote antiquity.

PROVINCIAL NEWS.

Cambridge.—The spire of the new Conduit, according to the local *Chronicle*, is now completely finished, and in celebration of the event, the Union Jack floated from its summit on Friday in last week. A very few days were to complete the entire structure, which had been retarded in consequence of the non-arrival of the slate basin.

Woolwich.—A new ship-building slip, contracted for by Messrs. Rigby, at the east end of the dockyard, and which has been twelve months in construction, is now completed. This new slip is sufficiently large for building men-of-war of the largest tonnage. It is 280 feet in length, and of proportionate breadth. The foundation and flooring of the shipway have been sunk to a considerable depth, a bed of concrete from 10 to 12 feet in thickness forming the lower stratum, which rests on the chalk rock. This is covered with brickwork. The floor consists of large blocks of masonry, 15 inches in thickness. The masonry and brickwork are set in cement. A portion of the river wall, in connection with the slip, is also completed. This important addition to the dockyard at Woolwich has been carried out under the general superintendence of Mr. Bourneys, clerk of the works.

Canterbury.—The new chapel school for the garrison is approaching completion. The addition of a gallery over the main entrance, not embraced in the original design, has caused some delay; but the whole will be finished in a few weeks.

Tunbridge-wells.—Towards the erection of the proposed schools in connection with Christ Church, the sum of 800*l.* has been already realised: this is half the estimated cost of the land, school-room, teacher's house, fittings, offices, &c. The committee have come to the determination to build the school-room only at present, tenders for which will be shortly submitted. Mr. W. E. Stevens is the architect, and the site is in Vale-road, adjoining the railway station.

Plymouth.—The committees appointed by the corporation and guardians of the poor have recommended the purchase of the old workhouse, with the view of erecting on the site a new guildhall, the present building not only being inconvenient, but inadequate in size to the requirements of the town.

Birmingham.—The sub-committee appointed at the recent committee-meeting of the Public Recreation Society here have taken the building known as the Midland Bakery, in Lichfield-street, at a cost of 50*l.* per annum. About 100*l.* will be required to fit it up, and its maintenance as a place of recreation will involve an annual expenditure of 150*l.* the whole of which must be provided by donations and subscriptions. Mr. W. Scholefield, M.P. and Mr. C. B. Adderley, M.P. have signified their desire to aid the movement by serving on the committee.

Liverpool.—The Liverpool and London Fire and Life Insurance Company intend erecting a handsome suite of offices, in High-street, uniform with the Townhall and the Exchange buildings, and designed by Professor Cockerell.

Manchester.—The contractors for the new Victoria Market, in Tommy-field, are rapidly proceeding with their work. The pillars and most of the girders have been got up, the woodwork of the roof is far advanced, and a good portion of the flagging and sewering of the area has been completed. It is confidently anticipated, says the local *Courier*, that the market will be ready for opening by Easter.

Alnmouth.—The funds for forming a road from Bilton Station to Alnmouth, and erecting a new bridge over the Alne at Alnmouth being inadequate, application has been made to the Duke of Northumberland, who has agreed to make up the deficiency, besides granting 8½ acres of land exclusive of the public road, if the committee will undertake to carry out and complete the road and bridge, as projected and estimated. The committee have been authorised to communicate with Mr. F. Charlton, as engineer, to endeavour to carry out the project, and to prepare plans and specifications.

ORGANS OF LARGE COMPASS.

IN the short notice of organs, printed in your number for Saturday last, there are a few mistakes which the writer,—Mr. W. Marshall,—will, I feel sure, forgive me for correcting. He says, "It is stated by Mr. Hopkins, that the organ in Westminster Abbey contains a 32 feet pipe (C C C C). I believe this is not the case. The organ at Exeter Hall, and the one at the Panopticon, in Leicester-square, are the only London organs embracing so large a compass." In reference to the above extract I would beg to assure Mr. Marshall, through the favour of your columns, that the Westminster Abbey organ *does* contain a pipe of the size in question (32 feet), and that the fact can be ascertained with more than the usual facility, inasmuch as the great pipe, duly labelled C C C C, lies on the choir screen, with its "long dimensions" entirely exposed to view. Moreover, the Exeter Hall organ does *not* contain a 32 feet pipe; its deepest sound being the F F F F note, produced from a pipe of 24 feet length, of which pitch and length of pipe other examples occur at St. George's Chapel, Windsor, and Chichester Cathedral. Mr. Marshall is quite right, however, in quoting Hill's magnificent organ at the Panopticon, as containing a pipe of the extreme dimensions mentioned above.

With regard to the Canterbury Cathedral organ, and the statement that "it was originally built for the Handel Commemoration, held in Westminster Abbey in 1791 (1784), and was afterwards purchased for the cathedral at Canterbury;"—the account written by Dr. Burney, and published in the year 1785, places the matter exactly the other way. The words of the learned musical historian are as follow:—"The excellent organ erected at the west end of the Abbey for the commemoration performances, was fabricated for the cathedral of Canterbury; but before its departure for the place of its destination, it was permitted to be opened in the capitol on this memorable occasion."

I hope you can spare room for these "facts and dates." EDW. J. HOPKINS.

Having noticed in the *Builder* of last week an observation as to the organ in Westminster Abbey (p. 35), I beg to state the compass of the above instrument is—great organ C. C. C. 16 feet, pedal organ C. C. C. C. open diapason, 32 feet. These pipes were made by Mr. Hill, when he reconstructed and enlarged the organ in 1848. The position of the organ in Canterbury Cathedral is in the triforium, as stated by Mr. Marshall. The compass of the organ in Exeter Hall, is F. F. F. 13 feet, pedal organ C. C. C. 16 feet, the double diapason not extending below F. F. F. F. 26 feet. The organ in the Panoptican extends to C. C. C. C. 32 feet, and is by far the largest instrument in London, and, I believe, for balance of tone, and beauty of mechanism, not surpassed in the world. There are other organs in England of 32 feet compass besides those mentioned by Mr. Marshall.—T. C. LEWIS.

WIDTH OF STREETS AND ALLEYS IN THE METROPOLIS.

THE Metropolitan Board of Works, at a meeting on the 18th, passed the following resolution:—

"That every street, excepting any mews, must be of the width of 40 feet at the least; but if the buildings fronting any street be more than 40 feet high from the level of the street, then such street must be of a width equal at least to the height of the buildings above such level. That every alley and every mews must be of the width of 20 feet at the least, but if the buildings fronting any alley or to any mews be more than 20 feet high from the level of the alley or mews, then such alley or mews must be of a width equal at the least to the height of the buildings above such level. And with regard to every such alley in reference to the entrance thereof, every alley must have two entrances thereto, each being at the least the full width of the alley, and one of the two at the least open from the ground upwards. And with regard to both such streets and alleys, the aforesaid width is to be ascertained by measuring (at right angles to the course thereof) from front to front of the buildings on each side of such street or alley. The word 'street' to include every square, circus, crescent, street, road, place, row, mews, lane, or place along which carriages can pass, or are intended to pass; and that whether there be or be not, in addition to the carriage-way, a footway paved or otherwise. The word 'alley' to include any court, alley, passage, or other public place which can be used as a footway only. If any person offend in respect of the conditions, regulations, and directions contained in this bye-law, he shall be liable for all the penalties and forfeitures imposed by the Metropolis Building Act, 1855, 18th and 19th of Victoria, chap. 122, in respect of any buildings either built contrary to the provisions of the said Act, or without due notice to the surveyor appointed in pursuance of that Act to inspect such buildings."

It was ordered that this resolution be communicated to all the district surveyors, with the view to give it as much efficacy as possible.

THE NEW BUILDING ACT IN THE CITY.

RUINOUS BUILDINGS.—VAULTS BENEATH PUBLIC WAYS.

THE attention of the City Commissioners of Sewers, at a meeting on the 22nd inst. was drawn to a report from Mr. G. Smith, one of the district surveyors, respecting the premises, No. 3, Queen's Head-passage, Newgate-street, in a dangerous state, the commissioners being empowered, under the Metropolitan Building Act, to act in such matters. The question arose whether the commissioners should appoint their own surveyor, or, as had heretofore been the custom, direct the district surveyors to attend to business of that character. After some discussion, it was rightly agreed that the matter *should be referred to the district surveyor*, the commissioners deciding in accordance, as they conceived, with the terms of the 79th section of the Act, which is as follows:—

"Whenever it is made known to the commissioners, hereinafter named, that any structure (including, in such expression, any building, wall, or other structure, and anything affixed to, or projecting from any building, wall, or other structure) is in a dangerous state, such commissioners shall require a survey of such a

structure to be made by the district surveyor, or by some other competent surveyor; and it shall also be the duty of the district surveyor to make known to the said commissioners any information he may receive with respect to any structure being in such state as aforesaid."

At the same meeting, a report on the construction of vaults beneath public ways, by Mr. Haywood, was read, wherein the surveyor recommended,—

"That the walls and arches be built of good hard stock bricks set in mortar or cement, and that the walls and arches be at least one brick and a half in thickness.

That the springing walls be at right angles with, and the ends of the springing walls parallel with, the line of the frontage of the house.

That the top of each arch be at least 2 feet below the surface of the pavement.

That 10 feet measuring from the front line of the house to the extreme outer point of the brickwork of the end wall be the greatest projection granted in any street; but that in streets where the footway has not so great a projection as 10 feet, that the external face of the brickwork be only allowed to the line of curb of such footways.

That, where ovens are constructed with vaults, they be built entirely independent of the walls and arches, and the surface of the crown of the oven be at least 12 inches beneath the under side of the arches of the vault.

That the openings for coals be as near the house as possible, and be covered with chequered iron plates, not less than three-quarters of an inch thick, and not more than 12 inches diameter.

The principal alteration herein proposed is making the crown of the vaults 2 feet beneath the surface, instead of 12 inches, as by the existing regulations, and this amendment may prevent the formation of any additional serious obstacles to laying the mains of the gas, water, and other companies beneath the footways."

The consideration of this report was postponed till the next day of sitting.

DISTRICT BOARDS AND THEIR SURVEYORS.

HACKNEY.

SEEING in your last number strictures upon the conduct of the Hackney District Board, in the election of their surveyor, I beg to state that the information you have received is not correct.

A considerable number of the testimonials had been sent round to the members of the board, who had perused them at their own houses: the rest were not read publicly at the board, but two members had devoted a day and till eleven o'clock at night to peruse and arrange them. And one reason why they were not read publicly, was the simple impossibility of getting through them all without sitting all day and all night, and a part of the next day too, and when No. 28 had been read, no one would have remembered the relative merits of Nos. 1, 2, or 3.

But it was less necessary, because the names or merits of the applicants were generally more or less known. Most of them were architects of classic education, which the board did not require. Had Sir Charles Barry been a candidate, he would certainly have been rejected. There is scarcely anything but the sewers and the roads which would come under the surveyor's notice, and a practical man was required, who would go down into the sewers and see for himself, if required. Such a one, far before all the rest, is Mr. Lovegrove, who was elected, who has been 13 years an officer of the Commissioners of Sewers in the Tower Hamlets, and is perfectly conversant with every part of them. I may add that he has constructed an ingenious model in gutta percha of the whole, with their different levels through which the water flows as in the sewers themselves. He is a stranger to me, but I voted for him from a sense of duty.

The only point in which I think the Board erred, was to require that their surveyor should not do any other business. This I opposed unsuccessfully.

JAMES EDMESTON.

*** The report in question is nevertheless quite correct as respects the meeting of which it gives an account. We know nothing to the prejudice of the gentleman elected, but we must, for the sake of other boards who have not yet appointed their officers, object most strongly to the principle adopted by the Hackney Board, which, according to Mr. Edmeston's own statement, put aside some who were willing to undertake the duties of the office at the salary fixed, because they were "Architects of classic education," and would have led them to reject Sir Charles Barry, if he had been a candidate, in favour of some mere rule-of-thumb man willing to go down into the sewers! It is this erroneous and mischievous notion which is placing England in the rear of other countries.

THE DECORATION OF CARLISLE CATHEDRAL.

THERE has been a difference of opinion amongst the authorities as to the amount of coloured decorations to be bestowed on the restored roof of Carlisle Cathedral. The architect, Mr. Christian, proposed an exact restoration of the ancient painting; covering the entire ceiling with colour, emblazoning the shields, &c. and continuing the decoration to a certain extent upon the walls. The authorities, excepting one, wished for partial painting only, some more, some less; and to have the greater part of the oak stained only, but emblazoning the shields and gilding the foliated enrichments. Not being able to agree, it was arranged that Mr. Owen Jones should be called in. He was accordingly consulted, and the result is that the work will be *completely* done. The whole ceiling will be painted, and the suggestion made as to the decoration of the walls will be carried out. A few alterations in respect of colours and gilding, and the decoration of the panels, were suggested by Mr. Jones, in all of which the architect concurred, and the work is now in progress towards the full extent of desired enrichment. Mr. Wm. Brougham, who has taken much interest in the restoration, has furnished the exact emblazonments for all the shields from an old record in his possession. It is hoped the work when completed will be as nearly as possible a perfect restoration of the ancient ceiling.

THE STATUE OF CHARLES I. AT CHARING-CROSS.

MANY of our London readers have doubtless observed that the hoarding which for some time surrounded the equestrian statue of Charles I. has been taken down, and that the group now looks more upright and stable.

The great object of what was done to King Charles' statue was security. It had originally been fixed to a slab of black marble, which had become fractured, and been pieced with Portland stone. Sir Francis Chantrey had some measures taken a few years back for its greater security, but it was thought advisable recently to do something more decided. Accordingly, under the direction of Mr. Scott, the shattered slab has been taken out, and one of granite, a trifle thicker, inserted, first securing the stones which form the cornice by the insertion of a copper chain bound all round it below the granite slab. The slab itself is secured to the pedestal by copper bolts running into the stonework below, and the feet of the horse similarly are secured to the slab. As one foot is raised, the centre of gravity is very much on one side of the supports, so that there is a decided strain upon one of the feet, which were found to be very insecurely fastened. This has now been effectually remedied.

The work has been carried out by Mr. Thomas, with the help of Messrs. Baker and Mr. Potter. The improvement in appearance is very considerable.

PROPOSED ARCHITECTURAL COLLEGE.

I AM glad to find that some of your correspondents are in favour of an architectural college, the subject of which I brought before your readers at page 478 of the last volume. The main feature of such a college would be, the course of study necessary to prepare a pupil for the office. A diploma would not come within its reach. After the preliminary training at the college, and the due completion of the articles in an office, the candidate for a diploma would be qualified to go before the tribunal appointed for its issue, which should be "the Council of the Institute," to undergo the necessary examination, and upon the result of that ordeal alone should he be declared entitled or not to the coveted document.

A college would never cramp genius: no course of study could put out the fire of the intellect. A man may be a "*born genius*," but, unlike "*murder*," it will not always "*out*." To foster the latent talent for the fine arts, to bring out the constructive ability of the student, is, I think, the means whereby a college can answer its end. Should the student prove entirely unfit for the profession of architecture, then would he be debarred from entering upon its duties, inasmuch as a proper certificate of merit would be required, ere the "parents or guardians" could be in a position to *seek* for articles, much less sign them.

A *compulsory* examination, at the present day, would be an absurdity, a *voluntary* one, but very partially adopted. We must begin with this matter—say with our present pupils, whose "term" may be five years hence, and with those who may be now training for the same, with a mere A B C knowledge of the rudiments of geometry, &c.

The present "rule of thumb" principle is loudly objected to. A *new style of architecture* is said to be a consummation most devoutly to be desired. But the opponents of the one and the advocates of the other may depend upon this, that unless they put their shoulders to the wheel, the gods will not condescend to help them! They are the very parties whose duty it is (if they are *convinced* of its necessity) to arouse the profession from its slumbers, and to set in motion the Juggernaut car which shall crush beneath its wheels the spectres of *routine and red tape*. If architectural Reformers won't work, the Protectionists must quietly hold their own.

In the establishment of a college, we can only ensure one thing—a certain quantity or amount of knowledge which *may become* a store of thought. This even is all we can accomplish by office training. But this is much! If the regularly qualified student loses the gift of self-application,—if he thinks that mental labour has ceased when the parchment is transferred to his pocket, and that he knows all he is required to know—then will his preceding and preparatory training be like the food he has already physically consumed,—sufficient for his wants up to that period, but incompetent to support life when once the "supplies are stopped." Self-culture is required even to the hour of one's death. All we can do is simply to provide the *vehicle* whereby study may be pursued, teach the necessity of that pursuit, and, if possible, give a zest to it. Having done this, we have accomplished our task: the rank and name of an "Inigo," "Sir Christopher," "Wykeham," &c. are open to all, if they will but use the means, that the desired end may be attained.

It will, I hope, become evident, that a College, such as I have described, can but supply these means of advancement, the proper *use* of which can *alone* gain its possessor "respectability." W. W.

GAS.

THE half-yearly meeting of the City of London Gas Company, was held on Wednesday, in last week, when a dividend at the rate of two per cent. per annum, clear of income tax, was declared.——The town of Malvern has just been lighted up. The commissioners, under the Local Improvement Act, applied to Mr. J. H. Jones, of London, and, acting under his instructions, public tenders were called for, and the construction of the gas-works plant, mains, &c. was entrusted to Messrs. C. Walker and Sons, of Tipton. The buildings and dwelling-house were undertaken by Mr. G. M'Cann, of Malvern, sublet from Mr. Kerby, of Nottingham. The gas-holder is 48 feet in diameter, 22 feet 6 in. deep, and contains 40,000 cubic feet of gas. The total length of mains is nearly seven miles, which extend to North Malvern. The works are capable of supplying 56,000 feet of gas per day. The elevation of the town being so much greater than the site of the works, the gas is checked in its flow by valves in the roads. There are to be 100 public lamps. The buildings are of Elizabethan construction. On lighting the town for the first time, a dinner was given to the workmen by the contractors, inhabitants, and visitors.——At a numerous meeting held at Handsworth Woodhouse, according to the *Sheffield Independent*, to consider the question of lighting this populous village with gas, Mr. Hedley, gas engineer (introduced by Mr. Stainforth, architect), laid before the meeting plans and estimates of the entire cost of works, 1,500*l*. which it was resolved to raise in shares of 5*l*. each. ——If we rightly understand the resolutions which were passed by the Town Council, at their last meeting, says the *Liverpool Albion*, authority has been given to the gas committee of the council to propose to the gas company that their share property shall be converted into bonds, bearing a fair and equitable rate of interest, and that the undertaking shall henceforward be managed by a board of nine directors, three of whom shall be appointed by the council, three by the consumers of gas, and three by the bondholders; also, to propose to the gas company that immediate reduction be made in the price of gas; that the borough engineer shall have authority to test the gas and ascertain the pressure at which it is supplied; that the company consent to the appointment of meter-testers; and that the powers of the auditor be extended.——The Cleckheaton Gas Company have made a reduction to consumers in the price of gas, which, as now fixed, is 5s. per 1,000 feet.——At Bishop Auckland, a public meeting was held on Wednesday before last, when a resolution for the formation of a company, to consist

of gas consumers, was unanimously agreed to. It is intended to supply the consumers with gas at the rate of 4s. per 1,000 feet: 480 shares of 3*l.* each were subscribed for by those present.——Tenders for lighting with gas the New Union Workhouse, at Chester-le-Street, having been called for, nine tenders were given in, ranging from (Spence) 130*l.* to (Bailey) 83*l.* 8s. The quantities were supplied by Mr. M. Thompson, architect.——The South Shields Gas Company find it necessary to materially extend their works, and for that purpose they have advertised the issue of new shares.——There is talk of a new gas company at Lincoln, the gas at present supplied being considered bad in quality, and insufficient in quantity. The local *Chronicle*, however, says that as to quantity, it is not deficient, the company having just completed works which will enable them to supply a city twice the size of Lincoln; but as to quality, the badness is admitted. It is explained, however, as arising from the fact that the company have not yet increased the purifying power to the requirements of the new manufacturing power, although they intend to do so. The price of gas at Lincoln is 5s. per 1,000 cubic feet, and so soon as the new works are paid for, a reduction is to be made to 4s.

Position of Gas Pipes.—A correspondent, in your number of the 5th inst. recommends that gas pipes should be imbedded in the plaster-work of new houses while the work is being proceeded with. My own experience points to quite an opposite practice, and I recommend gas pipes to be laid so that they can be seen and examined at any time. If concealed in the plaster-work of a wall, what is to prevent the workmen who follow, or the future occupant, *driving a nail* right through the pipe? as I know to have been done. In the house occupied by myself I had the pipes almost entirely laid as above recommended, viz. under floors, behind skirtings, or *visible* alongside an architrave, &c.; yet, where, in one instance, a pipe was buried in a cornice (for 8 or 9 inches only) there was an escape of gas whereof the source could not be found for a twelvemonth, and when found the cornice had, of course, to be cut away to allow of the hole being stopped, and then made good again at some cost and annoyance. Were it more common to exhibit the pipes, it would probably be found not so very difficult to make them decorative as well as useful.

L. L.

Gas Stoves.—Our attention, says the *Bath Chronicle*, has been called to two cases in which gas stoves have ignited the wooden floors on which they were placed: in one case, the conflagration of the whole premises must have ensued if the mischief had not been discovered in time. We do not mention these facts for the purpose of discouraging the use of gas stoves: on the contrary, we consider them to be, when properly fixed, an admirable and very safe mode of warming houses. They ought, however, to be placed so as to render impossible the ignition of neighbouring wood, and this, we believe, may be best effected by fixing them on sufficiently thick slabs of stone. Iron plates, liable to be heated, and coming in contact with boards, always involve risk.

THE MASTERS IN TRAINING AT MARLBOROUGH HOUSE.

IT is, I believe, very generally known that all provincial schools of art are now supplied with masters from a training class established at the head school of science and art, Marlborough House. The success or failure of the present system of *universal art education* must, therefore, in a great part, depend upon the members of that institution.

An acquaintance with the character and government of the class must, then, be of importance to all interested in the establishment of local schools of art.

The following is the subject matter of an address delivered by the head master to the "masters in training" of the abovenamed school, on the 23rd of November last:—

"I have hitherto endeavoured to govern you on *high gentlemen principles;* but the ill success attending my efforts obliges me to institute what is less honourable to yourselves—the *factory system. Nor can you complain of this, as by your own conduct you have forfeited every claim to my consideration as gentlemen or men of honour.*"

Lest there should be any doubt as to the literal meaning of this animadversion, I beg to state that one member of the class, for presuming to question it, was, without being allowed any opportunity of appeal, summarily expelled.

Thus, having devoted both time and money to the acquirement of, not actual knowledge of art, but a particular application of it; having successfully passed his "stringent examinations" and obtained his certificates; having, in fact, done all that was required of him as a master, he is found unfit for that office because he will not conform to the *factory system*, or submit to be treated as a disorderly factory operative.

I leave it to others to decide what may be expected from an institution where artists are not gentlemen, and where men without honour may yet be intrusted with the entire government of our provincial schools of design.* * * *

PROPORTIONS OF IRON GIRDERS.

INSTITUTION OF CIVIL ENGINEERS.

ON the 15th inst. Mr. Robert Stephenson, M.P. president, in the chair, the paper read was "On the relative proportions of the top, bottom, and middle webs of Iron Girders and Tubes," by Mr. J. M. Heppel.

The object of the paper was the investigation of the forces to be resisted by the middle webs of girders.

The first part of the inquiry had reference to the case of a plate of metal, subjected to the action of various direct forces, some compressive and others tensile,—simultaneously applied to it, in different directions; and it was shown, that these might always be resolved into two principal resultants, which were invariably at right angles to each other, and by which the applied forces, however numerous, might be conceived to be replaced,—the condition of the plate being absolutely the same, whether considered as subject to the forces originally applied, or to their two principal resultants.

The next point was the consideration of the condition of a rectangular plate, held in equilibrium by lateral forces, applied in couples, uniformly distributed along its sides; and it was shown, that in this case, also, there were two principal resultants,—one tensile and the other compressile; that these two were of equal intensity, at right angles to each other, and at angles of 45° with the applied forces; moreover, that their intensity was exactly equal to that of the applied lateral forces.

It was next shown, that the middle web of a girder exposed to a load, at a given point, was exactly in the condition of the plate last considered, and a rule for the computation of its thickness was arrived at.

Other cases of the distribution of loads, both fixed and movable, were then considered, and rules for the corresponding thickness deduced.

The effect of the horizontal strains to which the middle web was subject was then considered, and an investigation was made of the magnitude and direction of the resultants, arising from their composition with the diagonal forces before considered.

Finally the increase to be made in the thickness of the middle web, beyond that already arrived at, in order to enable it to deal with these horizontal and diagonal strains, together, was investigated, and a rule was deduced for its definite determination.

The results arrived it were briefly these:—

Four different cases of distribution of the load being considered, and in the first instance the horizontal forces being left out of consideration, and the thicknesses determined with reference to the diagonal forces only.

These four cases were—

1. That in which the load was fixed and central.
2. That in which a load concentrated on a point, moved along from one end of the beam to the other, as the case of a concentrated rolling load.
3. That in which the load was fixed and uniformly distributed.
4. That in which a load uniformly distributed was drawn on from one end, or that of a distributed rolling load.

It was then shown, that in order to enable the middle web to deal with the diagonal strains, its thickness should be determined by the following methods:—

In the first case,—the fixed central load,—by making it of uniform thickness, and such that its horizontal section was equal in area to the central vertical sections.

In the other three cases, the thickness of the middle web, at the extremities, was twice that determined as above. In all of them it diminished towards the centre, but in each case according to a different law.

In the second case,—the concentrated rolling load,—the thickness varied as the distance from the more remote extremity.

In the third case,—the distributed fixed load,—the thickness varied as the distance from the centre.

In the fourth case,—the distributed rolling load,—the thickness varied as the square of the distance from the more remote extremity.

* The writer has forwarded his name: the responsibility of the statement must rest with him.

The cases of combinations of these kinds of loads was then considered, and it was shown, that by dividing the central vertical section into portions, proportional to the amount of each kind, and thence determining the thicknesses from the middle web for each kind, according to its own law,—the sums of the thicknesses, so determined, would give those necessary for dealing with the compound load.

The effect of the horizontal forces was next considered, and two cases were taken—first, that in which the section of the beam diminished from the centre towards the extremities, in the ratio of the rectangle of the segments of the length; in which case the horizontal forces were constant, or nearly so, throughout.

In this case it was shown, that the thicknesses, as before determined, with reference to the diagonal forces alone, should be trebled, in order to fit them to resist the resultants arising from their composition with the horizontal forces; and, as in all beams, where any variation whatever was made in the vertical section, it did, or should approximate to the above law. It was considered, that this rule should be taken as applicable to beams of variable section.

For beams of uniform section, it was shown, that the thickness of the middle web should be such that the horizontal section should be three times the vertical area.

The stiffening of the sides was then considered. It was argued, that as the efficiency of stiffening must, in some way, depend on the amount of area, compared with the amount of support applied to it, it might reasonably be supposed to be proportionate to a line which would form a web to the rectified periphery,—a rectangle equal to the area to be supported,—which line (borrowing a phrase from hydraulics) might be called "its mean radius." Reasons were then adduced for believing that stiffening pieces might, with safety, be so distributed as to leave the mean radius of the included spaces equal to seventy times the thickness of the plate, although, in most early structures, it would be found to be much less than what would result from such a calculation.

IMPROVEMENT AT ROTHERHAM.

THERE have just been completed on the Eastwood estate, Rotherham, Yorkshire, five new roads, of an aggregate length of nearly three miles, one 45 feet wide, and nearly a mile-and-a-half long; the others 40 feet wide, and walled on both sides. Sewering has also been put in. When the Earl of Effingham, who is the owner of a small piece of land, lying between the Eastwood estate and the town of Rotherham, makes the street already laid out to connect Bridge-gate and College-street, Rotherham, with the western terminus of Fitzwilliam-road, a new road to Doncaster will be opened, which will relieve the transit from two steep hills, nearly two miles in length.

The works we have mentioned have been done under the direction of Mr. Charles Rawson, surveyor. Mr. William Ellis was the contractor, and the cost was between 6,000*l.* and 7,000*l.*

On the Eastwood estate, within the last year, there have been erected, on 800 years, building leases, from the freeholder (Mr. T. S. Badger, Lincoln's-inn), ninety houses of different classes, from the designs of Mr. William Blackmoor, architect. A square of artisans' dwellings has been laid out. The size of the square (called Shaftesbury-square), is 375 feet by 95 feet, and its eastern and [illegible]ern sides have been already filled up by the erection of artisans' dwellings. The third side of the square has been let on building terms, and will be covered this year with houses. Near and on the north-western boundary of the Eastwood estate, there have been completed and brought into operation, the new works of "The Rotherham Patent Tire and Axle Company," who, at the outset, employ upwards of 200 fresh hands. The last-named works have been erected under the superintendence of Mr. Bramwell, civil engineer.

Further, there are now being erected by Messrs. Yates, Haywood, and Co. of the Effingham Works, Rotherham, from designs by Mr. Blackmoor, a set of additional buildings, about 550 feet in length, adjoining the old works. The cost of these will exceed 8,000*l.* It is also intended that the Rotherham Grammar School and master's residence shall be rebuilt, and designs have been advertised for in the *Builder*. The day for sending in plans is the 21st of February next.

IRON CHAPEL IN THE MILE-END ROAD.—Mr. John Walker, the builder of this chapel, wishes us to mention that it is now an absolute purchase, and that a large portion of the purchase money has been paid, but he has given twelve months' credit to the trustees for payment of the balance by instalments of £80 each every three months.

Notices of Books.

Analytical View of Newton's Principia. By HENRY, Lord BROUGHAM, F.R.S. and E. J. ROUTH, B.A. Longmans. 1855.

THE great advance which has been made of late years in analytical geometry, and the ease with which problems in dynamics, formerly considered of great difficulty, can now be solved by aid of the "Differential Calculus," has caused the "Principia" to be thrown into the shade, and to be looked upon rather as a work to be read as a scientific curiosity than to be studied as a text-book by the aspirant after mathematical knowledge. Those, however, who are acquainted with the "Principia" are well aware that nearly all modern treatises on the higher branches of dynamics are indebted to that inimitable work for the basis of a large proportion of their investigations. Although the method of demonstration employed by Newton is similar to that used in Euclid's "Elements," and requires but a moderate knowledge of algebra, yet he is so concise in his reasoning that it requires careful and painful study to enable the student fully to enter into his arguments.

The work before us will prove a great help to those who desire fully to comprehend the beauty of Newton's theorems; and it also brings before the reader an account of the progress that has been made in the vast science of dynamics since the time of Newton. Lagrange, Laplace, the Bernouillis, Taylor, and many other great mathematicians have devoted their energies to extend the discoveries of Newton; and whilst many of their investigations have only tended to establish more firmly the great laws which he laid down, especially that of gravitation; yet, by aid of a more powerful analysis than Newton possessed, many problems have been solved which he attempted in vain. Among these we may mention the important problem in gunnery of finding the equation to the curve described by a projectile moving in a medium whose resistance varies as the square of the velocity, which can now, by aid of the "Calculus," be approximated to as nearly as we please. The motion of bodies in fluids generally has been taken up by Poisson, Challis, and others, and our knowledge thereon greatly extended of late years.

The "Analytical View" elucidates the great truths contained in the "Principia," shows the connection of its various parts, and simplifies many of the demonstrations, by making free use of algebra in place of the more abstruse synthetical form employed by Newton. The book possesses also much literary value, containing, as it does, a concise history of the principal discoveries which have been made since Newton's time respecting the laws which govern the motions of bodies, either in vacuo or in a resisting medium. Although the greater portion of the work requires a knowledge of the "Calculus" in any one who would thoroughly understand it, yet there is much information that the mere tyro in mathematics may gather respecting the great dynamical laws which prevail in the universe, and the nature of the proofs on which rest our knowledge of those laws.

VARIORUM.

THREE very elegant "Addresses delivered at Manchester, Leeds, and Birmingham," by Earl Stanhope, have been published by Mr. Murray, of Albemarle-street. The first is on the Progress of Literature and Science; the second, on the Study of History; and the third, on the Antiquities and Works of Art at Rome. The first was delivered at the Manchester Athenæum, the second at the Leeds Mechanics' Institute, and the third at the Midland Institute, Birmingham. Science, history, and art are the respective subjects of these excellent discourses. In the lecture on art at Rome, Lord Stanhope urges the advantages to art students and to our manufacturing designs of having an English Academy at Rome; and so soon as peace is re-established, his lordship proposes to bring the question before the House of Lords. He was assured, he says, at Rome, that every European nation, with one exception, has now an academy of art there, or some equivalent or substitute for an academy,—that one exception being England. In respect to our artists at Rome, it is his opinion that Gibson bears the palm; yet he deprecates the colouring of his statues, and he hopes that, notwithstanding Gibson's example, "colouring in figures may be left to the doll-shops."——Amongst "Quarterlies," we may here point attention to the new issues of the *Edinburgh Review* and the *Quarterly Review*. In the latter is an interesting article on Landscape Gardening and the Picturesque, based on a review of Sir Uvedale Price's work "On the Picturesque," with Sir T. D. Lauder's essay "On the Origin of Taste," &c. "It is singular," says the reviewer, "that at the present time, when the taste for gardening is so widely diffused, few or no attempts have been made to illustrate the theory of the art which all are practising. Yet it cannot be said that the subject is exhausted. Our predecessors assuredly have left us no immutable standard for imitation; for, recent as is the revolution which they cried up as the triumph of refinement, we are now far advanced in a counter-revolution. The modern improver is replanting the avenue and replacing the mullions which his grandfather removed with universal applause; or in digging out his new *parterre* he excavates the foundations of his ancestor's terrace,—that very terrace which his predecessor levelled to make way for the curves and the sweeps which he was told would 'bring nature to the parlour windows;' and so far are the controversies of the last age from supplying us with any fixed principles for our future guidance, that, though many of the works to which they gave rise contain tasteful remarks and useful suggestions, their reasonings, for the most part, are grounded on a false hypothesis of the nature and character of the picturesque—an error which still survives to perplex our judgment and vitiate our practice." We may return to this article at greater length. In the *Edinburgh* we observe an article on the Isthmus of Suez question, which might be profitably read in connection with the article in our present impression on the same subject. The reviewer, however, does not look very favourably on the canal project. "The proposals for a canal," he says, "have not been entertained in this country, simply because it is known that the difficulties of execution are far beyond the estimates, and that it would neither shorten the passage to India nor materially facilitate the intercourse between the mother country and its dependencies. At the same time," he adds, "the English people are intensely interested in the completion of the railroad through Egypt. They know that a line of steam communication between the East and Europe is almost indispensable in the present day for the accommodation of passengers and the conveyance of mails and light goods; and they feel that no exertions should be spared to make the line as perfect as possible." So far as regards the canal project, the reviewer thinks that a Commercial Commission ought to have been the first to investigate the subject in association with others capable of judging of the difficulties of navigating the seas between Cape Gardafui and Gibraltar. "When they decide," he remarks, "that this route is easier and safer than that round the Cape, and consequently that, when the barrier of the isthmus is removed, the greater portion of the Indian trade will come this way; it will then be time enough to ask the engineers to give their opinion as to the feasibility of the project." Yet surely that passage which the reviewer points out as of so much importance as a steam line for passengers and mail traffic might, even by flat-bottoms or otherwise, be made quite as safe and easy for the general trade.——Under present circumstances, there are few who will not read with interest the Rev. T. Milner's new volume on "Russia; its Rise and Progress, Tragedies, and Revolutions" (Longman and Co.). It contains but the salient points in Russian history; but a condensed compilation such as this, made up of brief and popular sketches of the most prominent or leading subjects of interest in that history, strung together so as to preserve the thread of the whole, while dropping all its heavier or less interesting items, is just the sort of book for the general reader of the present busy time.

Miscellanea.

LECTURES AT CARDIFF ART EXHIBITION.—Three lectures delivered in the Town Hall at Cardiff, during the art exhibition there, have been published by Mr. H. Bird, of Cardiff. The first is the inaugural lecture by Mr. H. A. Bruce, M.P; the second on poetry, by J. W. N. Crave, D.C.L; and the third on mechanical science, by Mr. H. Mackworth, C.E. government inspector of mines. The last contains some interesting statistics. "The rapid growth and prodigious magnitude of the cotton trade" is referred to as, "beyond question, the most extraordinary phenomenon of the age." In the year 1600, the finest wools were manufactured into what were called 'cottons.' Afterwards linen threads were used for the warp of a species of cloth, while the weft was of cotton. The spinning of cotton was a domestic manufacture in the last century; and in 1760, the value of the total production of cotton goods in Great Britain during the year amounted to 200,000*l*. In 1767, James Hargreaves, a carpenter of Blackburn, invented the spinning-jenny, by which at first 8 threads and afterwards 120 could be spun at the same time. The jenny could, however, only spin the weft. To supply the deficiencies of this machine, Sir Richard Arkwright invented his spinning-frame in 1785. A little later, Crompton brought out his mule jenny, a combination of Arkwright's water frame and the moveable jenny. "By way of comparison," says Mr. Mackworth, "we may take the amount of manual labour in producing the beautiful cotton fabrics of India, where it is considered an extraordinary effort for a man to spin one hank of thread per day. Now what are the results attained by machinery? One man in America can 'mind' a machine with 1,088 spindles, each producing 3 hanks per day, and giving 3,264 hanks as his day's work. The power loom was invented by the Rev. Mr. Cartwright. One girl in the cotton mills of Holyoke, in the United States, can weave, on four of these looms, 100 yards of yarn per day. The straps of some of the wheels used at these mills run at a speed of more than a mile a minute. In English factories the progress has been nearly as rapid, and on a still larger scale. In 1835, 350,000 persons were employed in them to work 115,000 looms, while in 1850 there were 600,000 persons to 298,000 looms, many of them capable of doing double work." A catalogue of the works of art, models, natural curiosities, and manufactures, &c. in the exhibition, has been also published, uniform with the lectures, which are copyright.

THE METROPOLITAN BOARD OF WORKS. — The Board met on the 18th inst. at Burlington House, to elect their secretary,—or clerk, as they seem resolved to call him, — one cannot well see why, unless to diminish his status, as well as his authority, as their representative and exponent. After a good deal of discussion as to how the thirty-one candidates ought to be disposed of, the number was reduced to six; and at length Mr. Woolrych, the late secretary to the Metropolitan Sewers Commissioners, was elected by 23 against 19 in favour of Mr. Josiah Wilkinson. On a subsequent formal motion, that Mr. Woolrych be appointed to the office, 34 of the members out of 45 voted in his favour. Mr. Hall afterwards intimated an intention to move before the Bye-law Committee, "That no member be eligible for any office of emolument in the gift of the Board." Major Lyon moved the adoption of regulations as to the width of streets and alleys, which we elsewhere speak of in our present impression.

THE ROAD THROUGH ST. JAMES'S PARK.—On Saturday, 19th, several of the residents in the immediate vicinity of St. James's Park, had an interview by appointment with Sir George Grey at the Home Office, relative to the contemplated road across the inclosure of St. James's Park. Mr. Keating stated in detail, on the part of the gentlemen present, the strong objections entertained by the inhabitants in the neighbourhood and the public generally to any encroachment upon the inclosure of the park, the source of so much enjoyment to so many of their families and the public at large, and asked to be informed whether the interference apprehended had been resolved upon by her Majesty's Government, or whether it was still open to those interested in the public convenience to remonstrate against it? Sir George Grey said, in answer, that the necessity for increased accommodation to the public, caused by the present inconvenient approach to the park through the Stable-yard, had engaged the attention of the Government; that several plans had been suggested at different times, including that to which reference had been made, in order to obviate the inconvenience complained of, but that up to the present time no plan had been decided on; that there would be full opportunity given for the discussion of those plans, and ample time for objecting to any of them; and that the preparation of the plans did not imply any foregone conclusion on the part of the Government.

SUFFOLK INSTITUTE OF ARCHÆOLOGY.—The quarterly general meeting of members and friends of this institution was held on the 10th instant, at the Athenæum, Bury, and was numerously attended. The Rev. Lord Arthur Hervey, the President, having taken the chair, invited the company, among whom were Lady Arthur Hervey and many other ladies, to visit the several objects of interest set forth in the programme. At the house of Mr. Kilner, in Guildhall-street, the party inspected a Norman doorway, circular-headed light, and pointed arch in the west wall of the house, and other objects of interest. The company then proceeded to the butter market, where, in the house occupied by the bank of Messrs. Harveys and Hudson, they were permitted to examine an enriched panelled ceiling, in good preservation, of the time of Henry VIII. At the house of Mr. Ridley, in Eastgate-street, some carved oak beams, resembling those in the aisle roofs of St. James's Church, and an original external window in a perfect state, of the period of the fifteenth century, were seen. A specimen of external decoration of the same period, preserved in the shoe-shop of Mr. Goodwin at the end of Mustow-street, was also inspected. On the return to the Athenæum, several communications were read, and it was announced that in the course of the works going on in the restoration of Rougham Church, a representation of the Day of Judgment had been brought to light, painted on the walls in the accustomed place above and on the sides of the chancel arch. It is in good preservation. Mr. G. R. Corner, F.S.A. communicated a list of manors and places in the county of Suffolk, fifty-four in all, in which the customary descent is to the youngest son. Various other communications were made, and documents, coins, and other objects of archæological interest, exhibited.

SARCOPHAGI.—At a meeting of the Syro-Egyptian Society, held on the 8th instant, according to the *Literary Gazette*, the Rev. Dr. Hewlett read a memoir on Egyptian Sarcophagi. The rev. gentleman described the various modes of interment in Egypt, the different kinds of sarcophagi, and the different descriptions of rock out of which they have been hewn. The frequent occurrence of the oval ring, the emblem of royalty, he argued, would tend to show that the stone sarcophagi were destined exclusively for kings. He then entered into details concerning the history of certain well-known sarcophagi, more especially the one in which Alexander's body was supposed to have been laid. Many of the existing sarcophagi, he thought, might have been removed from recesses in tombs and pyramids where travellers have deplored not finding any. He concluded by suggesting that the sarcophagi already discovered, and now distributed among the museums of Europe, might be made to furnish a clue to the history of the kings of Egypt. The venerable Archdeacon Raymond, Mr. W. H. Black, and other gentlemen, made some remarks upon the origin of the word sarcophagus—a Roman word, with Greek derivatives—which conveys an erroneous idea of the nature of the stone chests, or coffins, in which bodies were formerly deposited.

THAMES ESPLANADE AND RAILWAY.—The plans and model of this scheme, which, as already mentioned, includes the embankment of the Thames—the clearage of the sewage of London—a direct road for carriages and pedestrians on the north side of the river between London-bridge and Westminster—a railway throughout the same route—and a communication on the south side between the South-Western and the South-Eastern Railways, have been submitted to Prince Albert.

THE NEW STREET FROM THE LONDON DOCKS TO SHOREDITCH.—Notices of removal have been served upon the occupiers of the few remaining buildings that stand in the line of the new street, which has been completed, the gas and water laid on, the main sewer and side drains constructed, and the carriage-road and side-ways paved from Whitechapel to Fleur-de-lis-street, Shoreditch, and there now remain a few houses to pull down in order to throw the thoroughfare open for public traffic.

SINKING OF A PORTION OF THE DUNDALK AND ENNISKILLEN LINE OF RAILWAY.—Near Castleblaney a portion of this line—about 30 yards—has sunk, says the *Newry Examiner*, and, in a manner, disappeared. Sir John M'Neill is the engineer.

HALIFAX BOROUGH ENGINEERSHIP.—On the 14th instant, this appointment, together with the surveyorship of the local board of health, was conferred upon Mr. G. W. Stevenson, lately of the firm of Lee and Stevenson, of London. There were fifty-six candidates for the appointment, three only, however, being presented to the council for their selection of one of the number. These gentleman were Mr. Laing, town surveyor of Great Yarmouth; Mr. Tebbutt, town surveyor of Loughborough, and Mr. Stevenson. No personal canvas had been allowed.

YARMOUTH TOWN SURVEYORSHIP.—The vacant surveyorship of this town has been the source of severe labour to the sub-committee appointed to examine the applications for the office. Although the salary offered is only 150*l.* inclusive of everything, there were no less than sixty-seven applications, from which the committee at first selected thirteen, and subsequently, after examining the testimonials, they still further reduced this number to the following, in the order of preference: A. Mr. Herepath, B. Mr. Colbran, C. Mr. Dalton, D. Mr. Angell. The council, it appears, will have to decide amongst these gentlemen, as the sub-committee cannot agree to recommend any one of them in particular.

IRON ROADWAYS IN LONDON.—The City Sewers Commissioners last year resolved, on the recommendation of their surveyor, Mr. Haywood, to give a trial to an iron roadway, on a plan patented by General Knapp, an American. The road-laying was commenced in Leadenhall-street on Wednesday, in last week, by the contractors, Messrs. Crook and Son; Messrs. Ransomes and Sims, of Ipswich, being the founders. The pavement will consist of circular cast-iron rings, about 12 inches in diameter, and 6 inches deep, divided into seven compartments, one in the centre, and six surrounding it, rendering these apertures sufficiently small to prevent the catching of the hoof of a horse. The upper edge of the ring, and all the partitions, are thickly indented with semicircular depressions, about an inch in depth. A projecting hub on one side the ring, and a corresponding depression on the other, fit together, and thus lock the whole roadway into one solid framework. The indentations, with the gravel filling the whole to the surface, secure a foot-hold for the horse.

CROWNS OF OVENS.—The great inconvenience to public traffic arising from their defective construction, and constant renewal, might, it appears to me, be altogether obviated by the thickness of the arch being increased, and Stourbridge bricks and loam used in place of, as at present, any rubbish—place bricks, commonly, and mortar which perishes on the application of heat.—A SURVEYOR.

METROPOLITAN MANAGEMENT: ST. GEORGE'S, HANOVER-SQUARE.—At the first general meeting of this parish, convened under the Metropolitan Local Management Act, the attendance of vestrymen was somewhat numerous. At this meeting a discussion took place upon a notice of motion given by Mr. John Leslie, to the effect that the powers and duties vested in the vestry in relation to the sewage and drainage of the parish be transferred to the Metropolitan Board of Works. To this an amendment was proposed by Mr. Ryde and seconded by Mr. Westerton, that it was not expedient to consider such a proposition until they should have had further experience of the manner in which the Metropolitan Board of Works discharged its duties. This amendment was ultimately carried. A motion was passed to the effect that a committee be appointed to take the temporary management of the sewers, and to report to the vestry as to the staff of officers that would be necessary.

DWELLINGS OF THE LABOURING CLASSES.—The report of the inspector of dwellings, presented at the last committee meeting of the Society for Improving the Condition of the Labouring Classes, says:—"The lodging-houses are in a satisfactory state. The health and conduct of the inmates still continue all that could be desired. The average number of inmates in each establishment is as follows:—In the George-street house, ninety-seven; and in the Hatton-garden chambers, fifty-three weekly. The Charles-street and King-street houses, respectively, eighty-one and twenty-three nightly lodgers. The family houses in Streatham-street, Model-buildings, and Portpool-lane, are quite full. In the single women's rooms, at Portpool-lane, there are six empty out of sixty-four; and at Wild-court there are ten empty rooms out of 108. At Portpool-lane there are sixty-six females occupying fifty-eight rooms, fifty-eight single and eight double. The health of all the tenants in the society's family houses has been most satisfactory."

BAHIA.—At the Brazilian port of Bahia, or S. Salvador, a patent slip is about to be formed, on a plan by Mr. H. Law, C.E. and of such magnitude and power as will take up the largest transatlantic steamer, without discharging either coals or cargo, and with a number of other facilities, which will render it a complete dockyard, where building and repairing ships and machinery will be carried out on a large scale. The length of the slip will be 900 feet, 500 feet of which will be dry at low water. At the extreme end of the slip there will be 21 feet of water. Jetties, running out 1,000 feet, will be erected, and so constructed as to afford facilities for many vessels to discharge cargoes, and embark and disembark passengers, receive coal, &c. This enterprise, by last news, was to be forthwith commenced, and it is to be finished in eighteen months' time at furthest. When this project is completed, Bahia will become a port of great importance.

ROBBERY AT THE NEW WESTMINSTER-BRIDGE WORKS.—On 15th inst. a labourer, Samuel Sartain, was sentenced at Southwark Police-court to six months' hard labour at the House of Correction, for stealing rope, sacking, canvas, and tools, from the Westminster-bridge works, where he had been employed.

PUBLIC PARK AND MUSEUM, AT SALTLEY.—Some months since, Mr. C. B. Adderley, M.P. offered to set aside ten acres of land on his estate at Saltley, for the purpose of a park and recreation-ground, open to the public. Active steps are about to be taken to render the offer available. It has been decided to form a Working-man's Park Association, the members of which are to elect a committee and take the management of the park into their own hands. Besides the ten acres there is a large quantity of land reserved all round for building purposes, but until built upon it will form the play-ground. Mr. Adderley intends to erect at the principal entrance a museum and reading-room, at a cost of 1,300*l.* The admission to the park will be free, but a small charge will be made to visitors to the museum.

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For building offices in Mark-lane, for Mr. James Purssell. Mr. N. T. Randall, architect:—

	Front finished in cement above ground story.	Extra in Portland stone.
Wm. Cubitt and Co.	£9,206	£685
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Haynes and Eyre	8,940	730
Piper and Son	8,895	715
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Lucas, Brothers (accepted)	8,795	658

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"*Books and Addresses.*"—We are forced to decline pointing out books or finding addresses.

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APPRENTICE.—WANTED, by the Guardians of a Youth, aged about 16, a SITUATION, in which he would have opportunities of learning the above trades efficiently, and where his morals would be looked after. A premium would be given.—Apply, if by letter, to W. B. Post-office, Wellingborough.

A FIRST-RATE DRAUGHTSMAN, WRITER, and COLOURIST is now open to an ENGAGEMENT to execute plans of railways, estates, towns, drainages, docks, mines, collieries, and projects of every kind.—For specimens, &c. apply by letter to CYRUS, 15, Charing-cross.

AN ARCHITECT'S ASSISTANT desires a RE-ENGAGEMENT. Has had much practice in some of the best London Offices in preparing Gothic details, general drawings, and specifications for churches, houses, and fire-proof buildings of various kinds; and has also been in the habit of inspecting the execution of these works.—Address, A. B. 113, High Holborn.

TO LAND SURVEYORS.

A YOUNG MAN, aged 22, who has been three years in an architect's office, wishes for IMPROVEMENT with a Land Surveyor. Salary no consideration.—Address, A. B. 8, Pond-street, Hampstead.

PARTNERSHIP.—A Gentleman is desirous of entering into PARTNERSHIP with an ARCHITECT of established practice. The advertiser is fully qualified to take an active part, having been some time in business on his own account; or would not object to entering an office for a short period on salary, previous to partnership. References given and required.—Address, J. A. H. care of Mr. Wheeler, Royal Exchange-arcade, Manchester.

NORWICH UNION FIRE INSURANCE SOCIETY. (Established 1797.) Total Amount Insured 63,000,000l.

Insurances may be effected with this Company upon more favourable terms than with other Offices.

For prospectuses apply at the Society's Offices, Surrey-street, Norwich; and 6, Crescent, New Bridge-street, Blackfriars, London.

THE SURREY GARDENS COMPANY (LIMITED). PROVISIONALLY REGISTERED.

Offices, 25, Golden-square. Capital, 40,000l. in 4,000 Shares of 10l. each. Deposit 2l. per Share. Further calls not to exceed 2l. at one time, with two months' notice.

Committee of Management until the choice of Directors:—
Willert Beale, esq. 201, Regent-street.
S. Arthur Chappell, esq. 214, Regent-street.
T. K. Holmes, esq. 18, Pludyer-street.
George Bain, esq. 18, Parliament-street.
James Coppock, esq. 3, Cleveland-row, St. James's.
James Wyld, esq. Charing-cross.
Director of Music and Conductor—Mons. Jullien.
Architect—Horace Jones, esq. 16, Furnival's-inn.

The object of this Company is to supply a place of amusement of first-class character, at moderate price, and easy of access.

It is proposed to erect a Music-hall for the performance of Vocal and Instrumental Music, capable of accommodating 10,000 people, and available for Public Meetings, Fancy Fairs, Floricultural and Horticultural Exhibitions, Winter and Summer Fêtes of every kind.

Application for Shares may be made to the Secretary, at No. 25, Golden-square; or at the Royal Surrey Gardens; and a large portion of the capital being already subscribed for, immediate application is desirable. The responsibility of each Shareholder is limited by Act of Parliament to the extent of his Shares.

W. ELLIS, Sec. pro. tem.

THE SURREY GARDENS COMPANY (LIMITED). PROVISIONALLY REGISTERED.

Offices, 25, Golden-square.

No application for Shares will be received after the 31st instant.

By order of the Committee,
W. ELLIS, Sec. pro. tem.

SPECIAL NOTICE.

KENT MUTUAL ASSURANCE SOCIETIES.

CHIEF OFFICES:
QUEEN-STREET-PLACE, NEW CANNON-STREET, LONDON.

The united annual incomes exceed 27,000l.; and all Profits belong to the Assured.

LIFE.

The next division of Profits will include parties assuring before the 24th March next.

The new business of the last eight months exceeds 5,000l. in Annual Premiums.

FIRE.

The Guarantee Fund is being increased to Half-a-Million.

The annual income, since last annual meeting, has increased beyond 5,000l.

GEORGE CUMMING, Manager.

N.B.—Agents are still wanted for some vacant localities.

SPECIAL NOTICE.

The Books of the Society close on 1st of March, and Proposals lodged at the Head Office, or at any of the Agencies, on or before that date, will secure the advantage of the present year's entry, and of One Year's Additional Bonus over later Proposals.

MUTUAL LIFE ASSURANCE.

The Whole Profits divided amongst the Assured.

THE SCOTTISH EQUITABLE LIFE ASSURANCE SOCIETY. Instituted 1831. Incorporated by Special Act of Parliament.

The fund accumulated from the contributions of members, exceeds NINE HUNDRED THOUSAND POUNDS.

The annual revenue exceeds ONE HUNDRED and SIXTY-THREE THOUSAND POUNDS.

The amount of existing assurances exceeds FOUR MILLIONS and a QUARTER STERLING.

The amount paid to the representatives of deceased members is upwards of SIX HUNDRED and FIFTY THOUSAND POUNDS, of which SEVENTY-EIGHT THOUSAND POUNDS are Bonus additions.

The NEXT DIVISION of PROFITS TAKES PLACE at the 1st of MARCH, 1856, and policies effected before that date receive one year's additional bonus over those effected after that date.

ROBERT CHRISTIE, Manager.
WILLIAM FINLAY, Secretary.

Head Office—26, St. Andrew-square, Edinburgh. London Office—126, Bishopsgate-street, corner of Cornhill.

WILLIAM COOK, Agent.

GREAT BRITAIN MUTUAL LIFE ASSURANCE SOCIETY,
14, Waterloo-place, London, and 30, Brown-street, Manchester.

DIRECTORS.
THE CHISHOLM, Chairman.
RICHARD HARTLEY KENNEDY, Esq. Alderman, Deputy-Chairman.

This Society is established on the tried and approved principle of Mutual Assurance. The funds are accumulated for the exclusive benefit of the Policy-holders, under their own immediate superintendence and control. The profits are divided annually, and applied in reduction of the current premiums. Policy-holders participate in profits after payment of five annual premiums.

The Annual General Meeting of this Society was held on the 30th of May, 1855, when a Report of the business for the last year was presented, exhibiting a statement of most satisfactory progress. It appeared that during the two last years, 1853 and 1854, between 800 and 900 new Assurances had been effected, producing an increase of premium income amounting to 14,000l. per annum. It also appeared that, notwithstanding the extraordinary mortality which prevailed during the last year in consequence of the visitation of the cholera, it had not been found necessary to reduce, in the slightest, the allowance of 3½ per cent. previously awarded to the Policy-holders.

Credit is allowed for half the Annual Premiums for the first five years.

A. R. IRVINE, Managing Director.

14, Waterloo-place, London.

TO TELEGRAPH COMPANIES, CONTRACTORS, and OTHERS.—TO BE SOLD, a large quantity of LARCH POLES, straight, sound, and of good quality, well suited for telegraph-posts, and for railway or other fencing. The owner would deliver the larch either as poles or made up into posts and rails of any dimensions, at the port of Hull or elsewhere if required.—For further particulars apply to Mr. JOHN USHER, Appleby, near Brigg, Lincolnshire; or to Mr. THOMAS BELTON, Nostell, near Wakefield, Yorkshire.

OAK SASH-CILLS, QUARTERING, &c. ready cut out to sizes and lengths required, at the lowest price.

Address, E. SIMMS,

SAWING, PLANING, AND MOULDING MILLS, KING'S-ROAD, CHELSEA, AND WILTON-ROAD, PIMLICO.

COUNTER TOPS.—R. VIGERS, TIMBER MERCHANT, Kennington, Surrey, solicits the attention of builders and shop-fitters to his carefully selected MAHOGANY, suitable for Counter Tops, and to his seasoned Materials for builders, cabinet and blind makers, &c. Delivered, cartage free, to any of the London railway stations, or within three miles from Kennington Church.

TO BUILDERS, CARPENTERS, &c.

SAMUEL CROWHURST, Jun. begs to call the attention of Builders, Cabinetmakers, &c. to his Stock of seasoned and well-assorted Timber Goods, Deals, and Mahogany, in Logs, Planks, Boards, &c. at prices which will be found equal if not less than any advertised. Country Builders supplied on the most liberal terms.—Timber-yard, Hanover-street, Walworth; and Francis-street, Newington, near the Church.

AT the LOWEST PRICES.—SAMUEL PUTNEY has much pleasure in informing the Trade, that notwithstanding the recent advances, he is still enabled to quote the following low prices:—

Yellow Deals, from	£24	0 per 120
Spruce ditto "	18	0 "
Yellow Battens "	12	10 "
Pine Plank, 12 ft. 3 in. by 11	24	0 "

Honduras Mahogany, in logs, 5d. per foot.

Prepared Flooring, &c. at equally low prices. A list forwarded on receipt of a postage-stamp.—Borough-road, Southwark, and Elm-street, Gray's-inn-lane.

SEASONED FLOORING.—GEO. NOKES and CO. (late Archbutt and Atkinson), beg to acquaint builders and the trade, that they have a large STOCK of DRY WHITE and YELLOW FLOORING, prepared by machinery, always on sale, at the following reduced prices, for cash:—

¾ inch White,	13s. 6d. per square.	¾ inch Yellow,	15s. per square.
¼ ditto	15s. "	¼ ditto	16s. 6d. "
1 ditto	18s. "	1 ditto	20s. "

Laths, 30s. per load.

Also Timber, Deals, Planks, &c. Mouldings by machinery in very great variety.

ST. PANCRAS SAW-MILLS, Cambridge-street, Old St. Pancras-road.

ALFRED ROSLING begs to inform his Customers and the Building Trade generally, that he is enabled to allow a discount of 15 per cent. upon his list prices for Mouldings.—A large stock of dry flooring at low prices.—Southwark-bridge Wharf, Bankside.

GEORGE SMITH, TIMBER-MERCHANT, LONDON.—Address to No. 18, Binfield-road, Clapham-road, Stockwell; or Jamaica Coffee-house, City. Goods delivered from the Docks. PREPARED FLOORING, &c. from the Saw-mills. Goods in Bond for Exportation.

N.B. A large Stock of Dry Prepared Flooring, &c. from Two to Four Years Old.

EDWARD SIMMS begs to inform Builders and the trade, that he has now on hand at his manufactory (the first of its kind ever established), a large assortment of PREPARED FLOORS and MATCH BOARDING, seasoned, and ready for use, from ¼-inch to 1¼-inches thick, in White or Yellow Deal, Oak, or Pitch Pine. Also Dry Deals, in all thicknesses, Slating Battens, Pantile Laths, Oak Cills, Plank, and Scantlings. Mouldings in clean Pine, to any design. A pattern list forwarded on application.—Address, E. SIMMS, Flooring Manufactory, Wilton-road, Pimlico; and Sawing, Planing, and Moulding Mills, King's-road, Chelsea.

ACORN TIMBER WHARF.—At RICHARD MAY'S extensive Waterside Premises and Saw-mill, Canal Bridge, Old Kent-road, builders and others can be supplied with all kinds of FOREIGN TIMBER; planks, deals, and battens on sale, direct from the importers; prepared floor-boards, mouldings, pine and cut deals, slating battens, laths, English oak plank, and sash-sills, at reduced prices for cash. The Monthly Price Current forwarded on application.

NOTICE.—IMPROVED WOOD MOULDING MILLS and MARBLE WORKS.—J. SIMMONS begs to acquaint his customers and friends that in consequence of the increased trade and patronage he is continually receiving, he has found it necessary to have larger premises for the manufacture of his IMPROVED WOOD MOULDINGS, which are acknowledged by the principal large firms, architects, and others, who have used them, to be the best ever produced by machinery. J. S. in returning thanks for the liberal patronage already bestowed upon him, begs to call attention to his large stock of mouldings now on hand. Marble chimney-pieces, monuments tombs, and every description of marble and stone work also manufactured by patent machinery. NEW WORKS, No. 20, BRIDGE-TERRACE, HARROW-ROAD, PADDINGTON, about 100 yards from the Great Western Railway Bridge. New Price Lists will shortly be ready; to be had on application, or if forwarded, by enclosing six postage-stamps.—Please note the address—20, BRIDGE-TERRACE, HARROW-ROAD, Paddington, near the Great Western Railway Bridge.

PATENT SOLID SWISS PARQUETERIE. This beautiful, unique, economical, and elegant description of Flooring, so extensively used in Paris and other continental cities, is now introduced into this country: an extensive assortment of specimens and patterns commencing at 1s. per foot super together with every particular of its cost and adaptation, can be obtained of Mr. BURT, 3, Charlotte-row, Mansion House; or of Messrs. ARROWSMITH and CO. 80, New Bond-street.

MACHINE CARVING, JOINERY, and MOULDING WORKS, Belvidere-road, Lambeth.—The Proprietor of the above works begs respectfully to apprise the nobility, clergy, architects, builders, cabinet-makers, and trades generally requiring Carved and Moulded Works, that he is now enabled to execute any orders that may be entrusted to him with the utmost promptitude. Every description of Carved Work and Tracery, roughed out by the machines for the trade only. Pulpits, Lecterns, Reading-Desks, Screens, Altar-Rails, Tables, Chairs, &c. executed at the shortest notice. Specimens of Carved Work, suitable for various purposes, can be seen at the Works, and Estimates furnished upon application.

FRENCH POLISH and SPIRIT VARNISHES made from Methylated Spirit, 63 over proof.

Best French Polish	6s. 6d.	per gallon.
Spirit Varnish	6s. 6d.	"
White French Polish	10s. 0d.	"
Methylated Finish	6s. 6d.	"

By JAMES SLIPPER, 37, Leather-lane, and 14 and 15, Dorrington-street, Holborn, London.

STAINING DEAL TO IMITATE ALL KINDS of WOODS. It requires NO SIZING, and will stand the exposure to the weather. Price 6s. per gallon. Varnishes for W. NAYLOR'S Stains may be had at the Factory, 4A, James-street, Oxford-street; also Manufacturer of Improved Knotting and Decorative Varnishes.

WOOD-CARVING and FRET-CUTTING. T. HEWETSON, Wood-Carver, and Fret-Cutter, 5, Hatton-garden, London, begs to inform Architects, Builders, Iron-founders, Cabinet and Pianoforte Makers, that he is prepared to execute any kind of Architectural or Ornamental work, with accuracy and despatch.—T. H. particularly solicits the attention of Ironfounders, having had many years' experience in ornamental pattern making.—Estimates furnished.

IMITATION of WOODS and MARBLES.—A grainer of established name is willing to TEACH the above art, or portions of it, to a few adult pupils, by a course of tuition by means of evening lessons, to be entered on immediately. The advertiser having a little time to spare before the summer trade commences, is ready to devote it to the above purpose.—For particulars, &c. address A. B. 91, John-street, Fitzroy-square.

WINDOW BLINDS.—TYLOR & PACE, Window Blind Manufacturers, 104, New Bond-street, and 3, Queen-street, Cheapside, London, submit the following PRICES of WINDOW BLINDS, which they can recommend as being made in the best manner:—Venetian blinds, per square foot, 9d.; best holland blinds, on rollers, 6d.; best ditto, on spring rollers, 9d.; gauze wire blinds, in mahogany frames, 3s.; perforated zinc blinds, in ditto, 1s. 10d.; outside blinds of striped cloth, 8s. Transparent blinds in great variety. Engravings, with prices and discounts to builders and the trade, forwarded on application, post free.

FRANK SMITH'S ECCLESIASTICAL WAREROOMS, 13, Southampton-street, Strand.—Altar tables and chairs, pulpits, reading-desks, reredoses, font covers, &c. and every description of carving executed from architect's designs. Church walls, roofs, altars, &c. decorated. An Illustrated Catalogue sent on receipt of four postage-stamps.—Specimens may be seen at the Architectural Exhibition, Suffolk-street, Pall Mall, and at the Warerooms.

THE VIEILLE MONTAGNE ZINC MINING COMPANY'S PURE PATENT WHITE ZINC PAINT is unequalled for permanency of colour, hardness, and brilliancy of surface; it is unaffected by sulphureous or any other vapours or emanations. Being completely innoxious and free from the pernicious effects of white lead, it may be employed in all apartments whilst in use without any inconvenience to the inmates.

The greatest caution is recommended to avoid any spurious compounds that might be sold at cheap rates as Pure Oxide of Zinc. If any adulteration has taken place in the oxide, either in consequence of impurity in the material primarily made use of to produce it, an imperfect mode of production, or by mixing with the oxide certain substances calculated to give it increased weight, it then produces a very inferior instead of a very superior paint, and the economy realised by the purchasers of such oxides becomes a very expensive result to the owner of the premises painted with them.

The VIEILLE MONTAGNE'S ZINC OXIDES, dry or ground in oil, are sold with the VM mark—in Hull by Messrs. BLUNDELL, SPENCE, and CO.; when ground and dry, by Messrs. T. B. MORLEY and CO. and by the Company's Grinding Agents in London, Messrs. CHARLES DEVAUX and CO. Wholesale Agents, 62, King William-street City; and by the Manufacturing and Painting Agent, Mr. FREDK. BRABY, Fitzroy Works, New-road. In Manchester and Liverpool by R. CLAY, 8, Mersey-street, who is the acknowledged Painter to the Company for Zinc Paints, and undertakes painting ships, warehouses, dwelling-houses, &c. In Leith, by Messrs. R. ANDERSON and CO. Timber-bush; and in Southampton, by Mr. H. J. BUCHAN. Dry OXIDES and PAINTS, in kegs of 14, 21, and 28 lbs. and upwards, to be had of the Company's Agents in Birmingham, Newcastle, Glasgow, Bristol, Plymouth, Portsmouth, Norwich, Ipswich, Poole, and the Isles of Jersey, Guernsey, Man, and Wight; also in Dublin, Cork, and Belfast.

The Company also employ an acknowledged Painter in London, who will undertake any description of painting with Zinc Paint by contract.

For further particulars, apply to the Company's General Agency in London, 12, Manchester-buildings, Westminster.

TERRA-COTTA WORKS, Blackfriars-road, London.—The PRIZE MEDAL for MATERIAL and WORKMANSHIP in TERRA-COTTA to M. H. BLANCHARD, late of Coade's Original Works, and successor to them in the manufacture of this invaluable material, that has been so successfully adopted for nearly a century in this country, by our eminent architects and others, in the adornment of our noblest buildings, and is the only tried material that is capable to stand the ravages of time unimpaired. Groups, Statues, Vases, Fountains, and Architectural Embellishments, at prices and quality that will defy competition. A large Stock of newly-designed Chimney Shafts and Pots, to suit the various styles of buildings, at very low prices, and worthy of notice.

BLASHFIELD'S PATENT TERRA-COTTA, Manufactured at Mill-wall, Isle of Dogs.—Capitals, Consoles, Tracery for Parapets, Balusters, String Courses, Friezes, Bas-reliefs, Vases, Statues, Chimney-shafts, and all other Architectural Ornaments modelled, finished, and burnt, in the best manner, and warranted to stand heat and frost, either in Buff or Red-coloured Terra-cotta.—A great variety and large stock may be seen at BLASHFIELD'S Warehouse and Show-rooms, No. 1, Praed-street, Paddington.

PAPER-HANGINGS.—The CHEAPEST HOUSE in London for every description of PAPER-HANGINGS is CROSS'S WHOLESALE WAREHOUSE, 22, GREAT PORTLAND-STREET, Oxford-street, where you can select from the LARGEST and MOST EXTENSIVE Assortment in the Kingdom, THIRTY PER CENT. CHEAPER than any other house in the trade. Builders, Decorators, Dealers, and large consumers will do well to visit this establishment.

BEADON'S PATENT EAVES GUTTER TILES, for ROOFS of HOUSES (either old or new, whether of thatch, slate, or tile), and other structures. Sole agent, J. B. LAWES, 1, Adelaide-place, London-bridge. Having been appointed by the Patentee SOLE AGENT for the SALE of this ARTICLE, I beg to call attention to its merits. By a peculiarity of construction, the last tile is made to form a cheap and lasting water-trough; and by means of an open and angular half-joint for the reception of cement, a solid and compact gutter is obtained. The invention has been tested by four years' extensive use, with unfailing success. It supersedes the present expensive and imperfect modes of conducting rain from the roofs of houses. It is cheap and permanent, and removes all drip. It merits the attention of the landlord, the agriculturist, the owner of house property, the philanthropist, and the economist. Delivered free on rail or canal, at the works, Yelvetoft, near Rugby; or in London, Gloucester, or Bridgewater.

Price 4d. per Tile, of about 13 inches long. Stop-ends and Outlets, 6d.

TARPAULINS for COVERING ROOFS during Repairs. SCAFFOLD CORD and every description of ROPE used by Builders upon the lowest terms. Marquees and temporary Awnings on sale or hire. Orders per post receive the most prompt attention.—WILLIAM PIGGOTT, 113, Fore-street, City, Manufacturer, by appointment, to her Majesty's Honourable Board of Ordnance.

ROYAL POLYTECHNIC.—INEXHAUSTIBLE NOVELTIES!—Lecture on the Poison STRYCHNINE, by J. H. Pepper, esq. daily, at Four and Nine. The poison and the tests used for its detection exhibited in the oxy-hydrogen microscope.—The Second Part of the Voyages of Sindbad the Sailor, with new and beautiful Dissolving Pictures designed and painted by H. G. Hine, esq. and Description, with Songs, by Lenox Horne, esq.—Brilliant Popular Lectures on Flame, Fire, and Combustion, by J. H. Pepper, esq.; and on the Great Steam Electrical Machine, by Mr. Wylde.—3,000 Models and Works of Art on view.—Admission, One Shilling. Children and Schools; half-price.

PORTLAND CEMENT WORKS

NORTHFLEET, KENT.—Messrs. ROBINS and CO. with much pleasure announce to their Friends and the Public, that they have completed the enlargement of their works, in order to meet the great increasing demand for their Cement; and are now prepared to supply any quantity of the very best PORTLAND CEMENT, manufactured by them for all the purposes Cement is applicable.—Orders received at Great Scotland-yard, and at the Works.

PORTLAND and BATH CEMENT.—

FULLWOOD THOMPSON and CO. request the attention of Merchants and Contractors to the quality of their Portland and Bath Cement, which they manufacture on an improved system, securing regularity of strength and colour, and at a less cost than is attainable by most other makers.

These cements set under water in a few minutes, and are not affected by extreme heat or cold.

FULLWOOD THOMPSON & CO. will be happy to send prices and samples in reply to application by post. They deliver free into the Bristol and Exeter Railway Company's trucks at their works, or free on board in the Port of Bridgewater.

PORTLAND CEMENT WORKS, NORTHFLEET, Kent.—KNIGHT, BEVAN, and STURGE,

Manufacturers only of first-class quality, for the home and foreign trade. Portland Cement is manufactured at these works with especial reference to its destination, whether for stuccoing, brickwork, blocks for breakwaters, tidal work, or otherwise.—London Wharf, Belvedere-road, Lambeth.

ARTIFICIAL HYDRAULIC or PORTLAND CEMENT

combines the valuable qualities of the natural Cements with the additional advantage that it greatly excels them in its cementitious properties; that it is not affected by frost, and does not vegetate in damp situations. Account of COMPARATIVE EXPERIMENTS on the strength of this and other Cements (read at the Institute of Civil Engineers), to be obtained from the Makers, JOHN BAZLEY WHITE, and BROTHERS, Millbank-street, Westminster, who prepare one quality only of Portland Cement.

CEMENT.—ROMAN and PORTLAND

CEMENTS, and PLASTER of PARIS, manufactured by C. J. HILTON, can be had in any quantity, wholesale and retail, at his wharf, 6, Upper Thames-street, London; and also at the manufactory, Faversham, Kent.—N.B. These Cements supplied for shipment, on advantageous terms.

GEO. & THOS. EARLE, CEMENT MANUFACTURERS, HULL,

—Light and Dark, equal to any made. Manufacturers also, and Dealers in Plaster, Paris White, Mastic, Hair, Lias Lime, Laths, Slates, and Slate Slabs, Firebricks, Grindstones, Cement Chimney-tops, ditto Vases, Ridging, &c. Paints, Stucco, &c. Marble Merchants and Importers of Pozzolano.

NOTICE.—M. H. BLANCHARD, 74,

Blackfriars-road, London, Manufacturer of PLASTER of PARIS of a superior quality, suitable for Sculpture, Architectural Embellishments, &c.—will not twist, warp, or give after set, but will retain its hardness and strength.

Superfine, per ton	£7 0 0
Fine	3 0 0
Coarse	2 10 0

Delivered for Cash to any of the Metropolitan Railway Stations, or within the Metropolis.

KEENE'S and PARIAN CEMENTS and FRENCH PLASTER,

for internal uses. These well-known hard Stuccoes dry quickly, and can be painted upon within a few days.—Made and sold by JOHN BAZLEY WHITE and BROTHERS, Millbank-street, Westminster.

TATHAM & CO.—No. 14, SOUTH WHARF, PADDINGTON,

BRICK, LIME, and CEMENT MERCHANTS, SOUTHAM BLUE LIAS LIME DEPOT.

Bath, Portland, Lias, and Roman Cements; Parian and Keene's Cements, Plaster of Paris, Glazed Stoneware Sewage Pipes, Fire Goods, Vitrified Blue Bricks, White Building Bricks, White Enamelled Pans and Traps, and every description of Building Material.

N.B. Lump and Ground BLUE LIAS LIME delivered in boat-loads direct from the Works in Warwickshire, to any part of the river or canal.

SOUTHAM BLUE LIAS LIME DEPOT,

No. 14, SOUTH WHARF, PADDINGTON.

TATHAM & CO. have arranged for a constant supply of the above very superior BLUE LIAS LIME, which for the last two years has been extensively used at most of the large works constructed during that period or now in hand, and any orders they are favoured with will command their best attention.

Boatloads of either Lump or Ground Lime can be delivered direct from the Works in WARWICKSHRIRE to any part of the Rivers Thames or Lee, alongside any wharf on canal, or by boat or rail to any part of the kingdom.

11, George-yard, Lombard-street, City.

ELMLEY CEMENT WORKS, ISLE of SHEPPEY, Kent.—ROMAN and PORTLAND CEMENT

of the first quality, manufactured on the above works. Also STOCK and KILN-BURNT BRICKS, hand moulded and machine made, for shipment or otherwise.—Apply to G. BOOTH, Agent, as above.

PARIAN CEMENT is reduced in price, by

the Patentees and Manufacturers, FRANCIS, BROTHERS, Nine Elms, London. This internal stucco may be painted or papered within a few hours of its application, and rooms be thus made dry and habitable immediately.

PORTLAND CEMENT.—TATHAM & CO.

are enabled to offer a very superior quality of this valuable Cement at a moderate price, and all orders addressed to No. 14, SOUTH WHARF, PADDINGTON, will receive the best and most prompt attention.

PORTLAND CEMENT.—JAMES

WESTON having enlarged that portion of his CEMENT WORKS on Millwall, Poplar, for Manufacturing the above CEMENT, begs to inform the Trade in general that they can be supplied with any quantity they may require, either at his Works, St. Andrew's Wharf, Earl-street, Blackfriars, or Middle Wharf, Scotland-yard, Westminster. Manufacturer of Roman, Lias, and Mastic Cements, English and French Plaster, &c.

PORTLAND CEMENT.

CHARLES RICHARDSON,
6, SOUTH WHARF, PADDINGTON.

PORTLAND and ROMAN CEMENT,

TERRA-COTTA POTS, &c.—J. M. BLASHFIELD begs to acquaint the Public that he has entirely CLOSED his Establishment on the Surrey side of the Thames, and that articles of his manufacture can only be obtained at his Works, Mill-wall, Poplar, or at his Warehouse, Praed-street, Paddington.

BATH, PORTLAND, and ROMAN CEMENTS GROUND and LUMP HYDRAULIC BLUE LIAS LIME.

The LONDON and WEST of ENGLAND CEMENT COMPANY can offer to the trade the best Hydraulic Cements, at reduced prices, the material being excavated in its pure and unadulterated state, from quarries on their own property. The Company particularly recommend a trial of their XXXX Bath Cement, as far superior to any article now in the market. These cements can be sent by rail or shipped from their wharf, direct to all parts.—Agents required, and a liberal discount allowed. Orders received by Mr. KIALLMARK, 80, Old Broad-street, City.

DAMP WALLS.

STENT'S COMPOSITION FOR PREPARING NEWLY-PLASTERED OR DAMP WALLS FOR PAPERING,

is the result of practical experiments and long experience; it is unfailing in its application. Entire houses have been papered a few days after plastering. In repairs of old plastering it is invaluable. A moderate room can be papered for 2s. 6d.

Prepared only by W. J. STENT, Warminster.

London Agents: Messrs. GEO. and THOS. WALLIS, 64, Long-acre. Agent for Ireland: Mr. S. BOYD, 46, Mary-street, Dublin.

HUBBUCK'S PATENT WHITE ZINC PAINT,

The Permanent White of the Ancient Artist.

HUBBUCK and SON, the Original Manufacturers, are enabled, by a process which is patented, to supply their Pure White Zinc Paint at the price of White Lead. Neither exposure to heat, nor tropical climates act upon it. It is entirely free from any poisonous or pernicious property. Those direful maladies, paralysis and painters' colic, will be altogether avoided. The Powdered White Zinc may be had for grinding in Oil; also for Plaster Decorations, and where it is used with Size, Varnish, &c. Sold by the Wholesale Paint-dealers in Original Packages, each cask stamped—HUBBUCK—LONDON—PATENT. And when so marked, the quality is guaranteed. Full particulars may be had of THOMAS HUBBUCK and SON, the Original Wholesale Manufacturers, Paint and Varnish Works, opposite the London Docks, London.

N.B. OLD ZINC AND ZINC CUTTINGS BOUGHT TO ANY EXTENT.

MEDWAY LIME and CEMENT WORKS,

LOWER HALLING, near Rochester.—T. H. BOORMAN, WILD, and CO. beg to inform the public and trade generally, that they have completed their works for the manufacture of PORTLAND CEMENT, and from their contiguity to the river Medway, as well as the branch line of the South-Eastern Railway from Strood to Maidstone, a siding from which will be carried into their works, enabling them thereby to transmit any orders they may receive to any station on the before-mentioned line, and confidently hope they shall be able to supply the public with a first-rate article, in both cement and lime, on moderate terms. Persons sending orders for cement, are respectfully requested to say for what purpose it is required, and printed instructions will be affixed to the head of each cask.—Orders to be addressed to Mr. THOMAS WEEKES, Agent at the Works.

Agents in London:—Messrs. GEORGE POTTER and CO. Lime Merchants, Purfleet Wharf, Blackfriars; and 19, North Wharf-road, Paddington.

TO BUILDERS, CONTRACTORS, SHIPPERS, and Others.

GEO. BURGE, JUN. ROMAN and PORTLAND CEMENT MANUFACTURER,

Crown Wharf, Great Scotland-yard, Westminster.

DAVIES and NORMAN, Agents.

Cements, Plaster, Lime, Bricks and Tiles, Sand, Fire Goods, &c. &c. of superior quality, and at reasonable prices.

GLAZED STONEWARE DRAIN-PIPES, CLOSET-PANS, &c.

IN EVERY VARIETY.

ATKINSON'S CEMENT,

so long known and esteemed in London for plastering purposes, is a quick-setting Cement, that requires no colouring.—Sold exclusively by JOHN BAZLEY WHITE and BROTHERS, Millbank-street, Westminster; and Seel-street, Liverpool.

NOTICE.—BLUE LIAS LIME.—

L. B. PEARSE and CO. beg to inform Architects, Engineers, Builders, and Contractors generally, that they have now accepted the AGENCY for the above valuable HYDRAULIC LIME, from the original quarries, Stockton, Warwickshire, and are now supplying direct from the works in their own boats, at a reduced rate.

L. B. PEARSE and CO. beg further to give notice to consumers, that they have erected, at a considerable expense, large buildings and machinery for grinding lime and cement, so as to insure genuine quality and large supply, at their extensive premises, situate on the Great Northern Railway, York-road, King's-cross.

GREY STONE LIME WHARFS,

12, UPPER GROUND-STREET, Blackfriars (Surrey side), 7, NORTH WHARF-ROAD, Paddington.

WILLIAM PETERS begs to inform the trade he is in a position to supply the best GREY STONE LIME in any quantities from the above wharfs, or per barge direct from the kilns.

Large Grey Stone, or Grey Chalk, free on board at Works, 1s. 9d. per ton.

Small ditto, ditto, 4d. per ton.

Barges loaded in a few minutes.

Wouldham-hall Grey Stone Lime Works, on the Medway, near Rochester.

NOTICE.

GREAVES'S BLUE LIAS LIME and CEMENT,

6, South Wharf, Paddington-basin, London, March 20, 1855.—CHARLES RICHARDSON hereby informs his friends he has taken another Wharf adjoining, especially to keep a LARGER STOCK of the above valuable HYDRAULIC LIME always on hand, that in future all orders may be punctually attended to. Orders for export, or alongside rivers, canals, or railway stations, should be given a few days before required.

GIBBS, CANNING, and CO.'s BLUE VITRIFIED BRICKS, PIPES, JUNCTIONS, BENDS, and FIRE GOODS.

ROMAN, PORTLAND, PARIAN, ANSTON, and LIAS CEMENTS of the best quality.

SECONDS, PAVIORS', STOCKS, and other BRICKS.

GREAVES'S BLUE LIAS LIME.

CHARLES RICHARDSON,
6, SOUTH WHARF, PADDINGTON.

BATH CEMENT.

CHARLES RICHARDSON,
6, SOUTH WHARF, PADDINGTON.

GREAT NORTHERN WHARF, York-road,

King's-cross.—WHITE BRICK and TILE DEPOT.—L. B. PEARSE and CO. Brick, Tile, Lime, and Cement Merchants Builders, contractors, and others supplied with every description of building material at the lowest market prices.

TO CEMENT and PLASTER MANUFACTURERS and OTHERS.—TO BE DISPOSED OF,

a CEMENT STEAM-MILL, with wharf, two kilns, plaster oven, and extensive cellaring and wareroom, situated in an increasing town, on the South Coast Railway. The premises are held under a lease, with power of purchase. As a knowledge of the business is not needful, the concern is well worthy the attention of an active man, with small capital, who would devote the whole of his time to its extension.—Apply at 39, Cranbourn-street, Leicester-square.

PRIZE BRICK-MAKING MACHINE.—

Chamberlain's Patent.—This portable machine will make 20,000 solid bricks per day, of far superior quality to hand-made, with 3-horse power; one man to feed the machine with clay, and boys to remove the bricks. For a plate and description, see "Practical Mechanic's Journal," for January 1st, 1856.—Any further information, for the machines seen at work, on application to Mr. HUMPHREY CHAMBERLAIN, Kempsey, near Worcester.

BRICKS.—200,000 STOCK BRICKS,

delivered into trucks at Wimbledon Railway Station, at 25s. per thousand. Place Bricks, at 20s.—Apply to J. D. 9, Townwall-street, Dover.

WHITE SUFFOLK PERFORATED BRICKS.—

Messrs. J. EASTWOOD and SONS take this opportunity of informing their customers and the trade, that they have made arrangements for the Manufacture of White Suffolk Perforated Bricks. In curing defects common to bricks of this description, care has been bestowed, in order to produce them of a true and perfect shape, of an even and beautiful surface, and free from fire-flaws.—J. EASTWOOD and SONS, Belvidere-road, Lambeth.

THE BEST HERTFORDSHIRE MALM SECONDS;

THE BEST WHITE SUFFOLK and RED FACINGS: DEEP-RED RUBBING BRICKS.

Also COWLEY and KENT STOCKS, in any quantity.

J. EASTWOOD and SONS, Belvidere-road, Lambeth; and Surrey-canal-bridge, Old Kent-road, Surrey.

BRICK-FIELDS, QUEEN'S-ROAD, PECKHAM, SURREY

(Within a short distance of the five bridges).

THE BEST MALM-CUTTERS, SECONDS, PICKINGS, and PAVIORS, in any quantity.

Also, STOCKS, of FIRST QUALITY.

J. EASTWOOD and SONS, Belvidere-road, Lambeth.

WHITE SUFFOLK and RED FACING BRICKS.

COWLEY, KENT, and ESSEX BRICKS.

Also Yellow and Pale Malm Seconds, Cutters, Paviors, Shippers, &c.

KENTISH RAG-STONE of the FINEST QUALITY.

MILLS and PRICE, 5, ADELAIDE-PLACE, London-bridge.

Depôt, Agar Wharf, King's-road, St. Pancras.

VITRIFIED STAFFORDSHIRE BLUE BRICKS,

Paving, Roofing, and Ridge Tiles, Sanitary Pipes, &c. Stourbridge Fire Goods, &c. of all descriptions, and of best quality.—WOOD and SON, Manufacturers, Portway, Oldbury, near Birmingham. Agent — Mr. J. UNWIN, Private Residence, 59, Nelson-square, Blackfriars-road.

BRICKS.—Malm Cutters, Yellow and Pale

Seconds, Paviors, and Pickings, of good and sound quality, constantly on sale at H. DODD'S Brickfields, which are only a quarter of an hour's walk from the City. H. D. earnestly requests purchasers to favour him with a visit, in order to inspect his stock, and to judge for themselves.

Malm Place, half-washed Stocks, and Place Bricks, also on sale. These bricks are sound, well burnt, and unusually free from defects; a very large proportion of the stock being suitable for external facing.

Apply to HENRY DODD and CO. at the Counting-house, Hoxton Brickfields, Grange-walk, near the Rosemary Branch, Hoxton.

N.B. Light-coloured Pit Sand of approved quality constantly on sale upon reasonable terms. This Sand, from its not containing any saline matter, is acknowledged to be preferable to river sand.

BRICKS, LIME, WHITING, TILES, FLINTS, GRAVEL, &c.—Messrs. MEESON and CO.

supply stocks, pickings, rough stocks, place, red kiln bricks, paviors, &c. &c. on low terms, to any part of the Thames, the various canals, the River Lea, &c. or by rail to any station on the Eastern Counties line, or any railway connected with it. Also, flints for building boundary walls, stables, cottages, &c. by using which one-third of the expense may be saved. Also, lime, chalk, chalk rubbish, gravel, loam for foundries, &c. &c. Whiting of the best quality, lime, both white and flare, bricks fire-goods, &c. can be obtained at Messrs. MEESON'S Wharf Kilns at Bow-bridge, Stratford, Essex; or from the Works at Gray's, Essex.—Orders, by letter, to Messrs. MEESON and CO. Gray's, Essex, executed with despatch.

BRICKS! BRICKS! BRICKS!—100,000

of good, sound PLACE BRICKS for 95s.—Apply to T. SAINT, Walmer-road, Notting-hill, Kensington.

TO BUILDERS and OTHERS.—BRICKS

delivered at any part of the River up to Battersea-bridge, at the following prices, viz.:—Grey Stocks, 28s. per thousand; Grizzles, 20s. per thousand; Rough Stocks, 20s.; Place, 16s.—Terms, cash on delivery.—Apply to Mr. G. SMEED, Sittingbourne, Kent.

TO BRICKMAKERS, BUILDERS, and CONTRACTORS.—HOO, near ROCHESTER, KENT.—TO LET, a BRICKFIELD, working three stools, near the river Medway. Royalty one shilling per thousand. Earth of good quality, produces very sound bricks, and can be flat dug.—Apply to Mr. JOHN JEFFERY, Milton-terrace, New Road, Chatham.

AN established BRICKFIELD TO LET,

at Shepherd's Bush.—Apply on the Spot, to Mr. ROBINSON, No. 1, Oakland Villa.

BEADON'S EAVES GUTTER TILES.—

Mr. LAWES is prepared to CONTRACT for the ERECTION of the above TILES on roofs of all descriptions, in the neighbourhood of London, at 7d. per foot; above 100 feet, 6d.—Office, 1, Adelaide-place, London-bridge.

MINTON and CO.'S ENCAUSTIC and other PATENT TILES,

for Churches, Entrance Halls, Conservatories, Balconies, &c.; Antique, Geometrical, and Alhambric Mosaics, manufactures of a highly decorative character, and extreme durability, Slabs and Tiles for Fireplaces and Hearths, Copings for Grates, Door Furniture, White Glazed and Ornamental Tiles for Baths, Dairies, and Kitchen Ranges, may be had, in great variety at their Warehouse, 9, Albion-place, Blackfriars-bridge, London; and at their Manufactory, Stoke-upon-Trent, Staffordshire.

PEAKE'S TERRO-METALLIC TILES,

PIPES, &c.—Notice is hereby most respectfully given, that the LONDON DEPOT for this WARE is REMOVED to No. 21, WHARF, Macclesfield-street North, City-road Basin. Secondly, that the trade term, "TERRO-METALLIC," is the exclusive right of the Proprietor; and, thirdly, that the "REPORTS OF THE JURIES," page 581, of the Great Exhibition, rank the Manufactories known so long as "The Tileries," Tunstall, Staffordshire, as the first of the kind in the world.